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DECEMBER, 1943
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with which is incorporated The Institution of Aeronautical Engineers

Edited for the Council by Capt. J. LAURENCE PRITCHARD, Hon. Fellow

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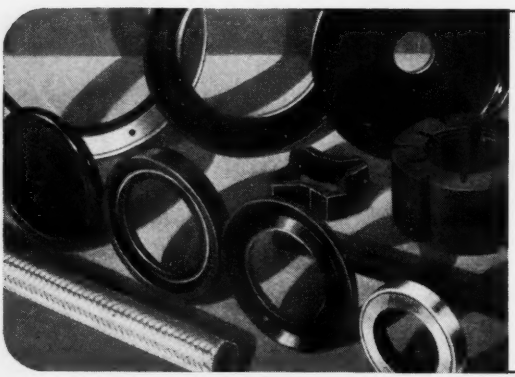

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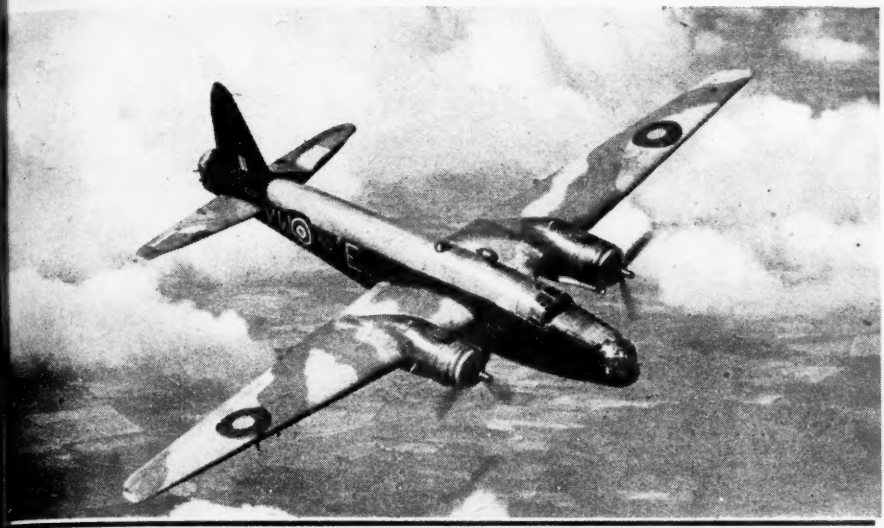

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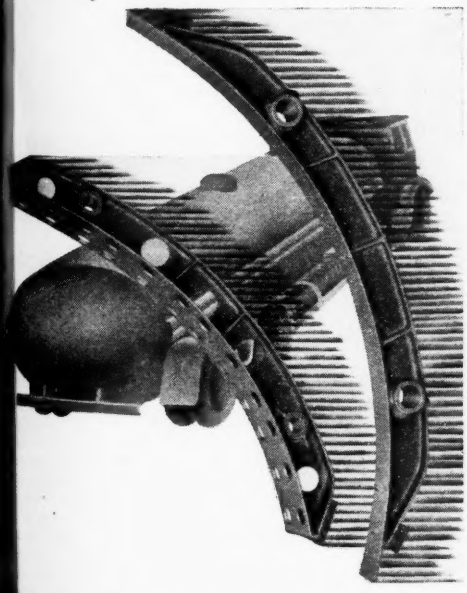

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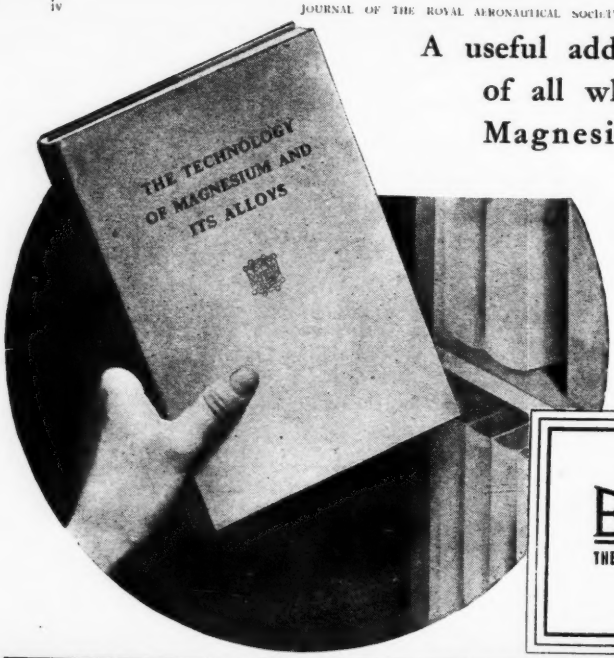

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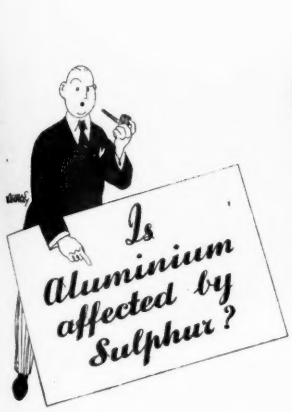

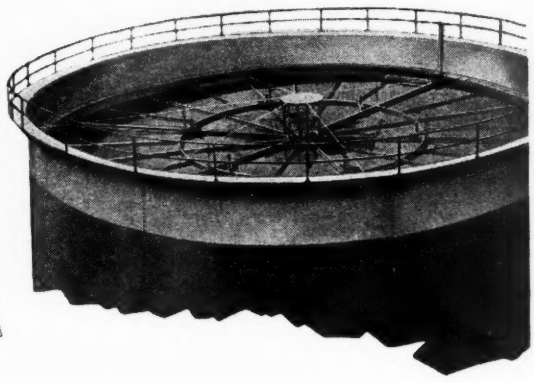

NO—sulphur does not have any appreciable effect on it; and speaking of aluminium, it is interesting to note that it is eminently suitable as a material for plant and equipment in contact with hydrogen sulphide, sulphur dioxide and certain sulphuric acid solutions. Besides their extensive use in the gas and petroleum industries, aluminium alloys are widely used throughout the chemical and food industries as non-toxic materials possessing a high resistance to corrosion against a wide range of inorganic and organic substances. HIDUMINIUM Anticorodal aluminium alloys will enable post-war designers to provide equipment and plant capable of longer service with lower maintenance costs than ever. The Development Department will be pleased to send data on request.

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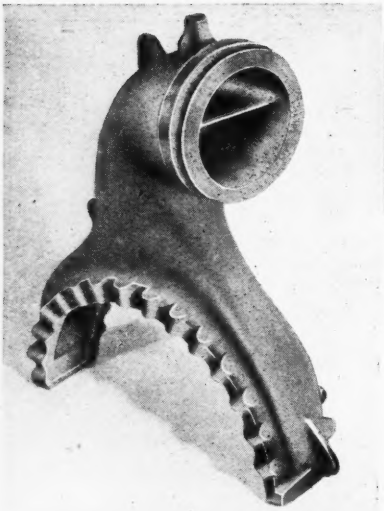

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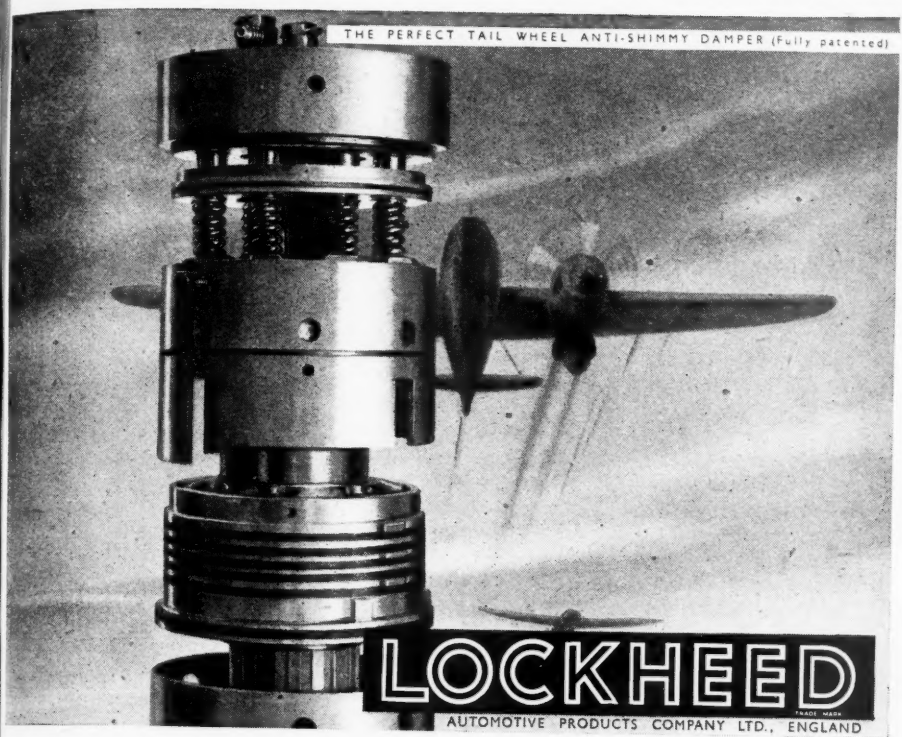
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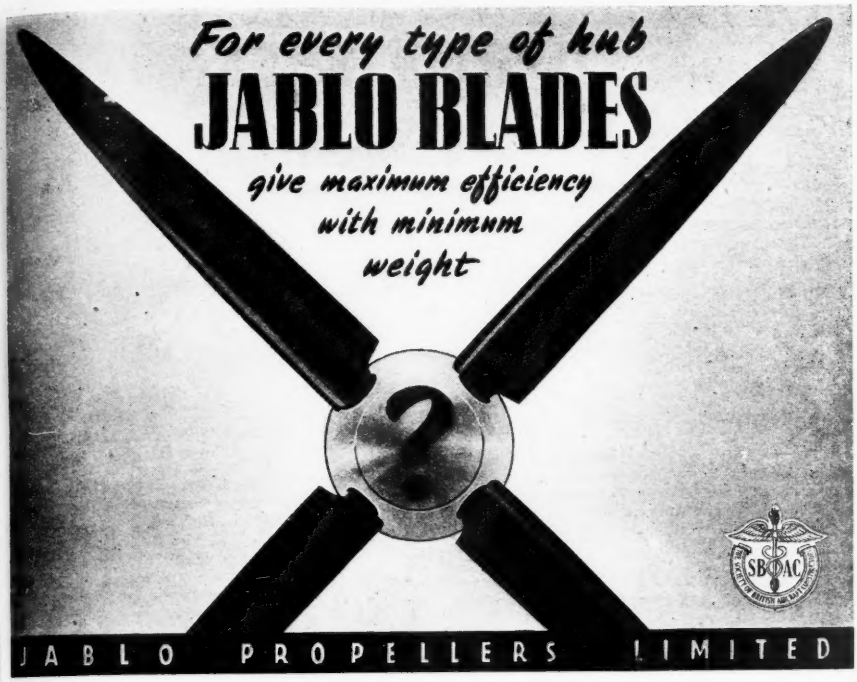

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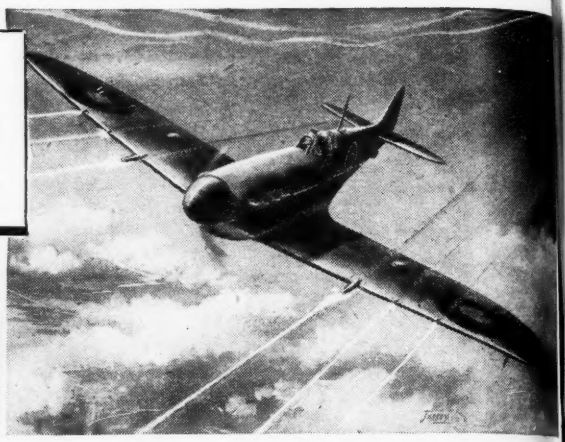

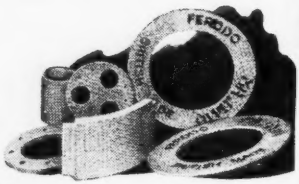

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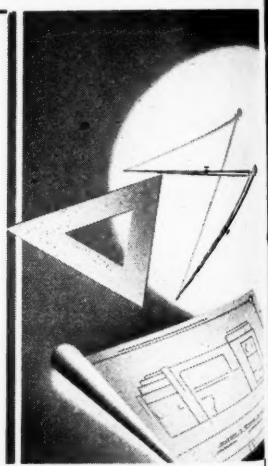

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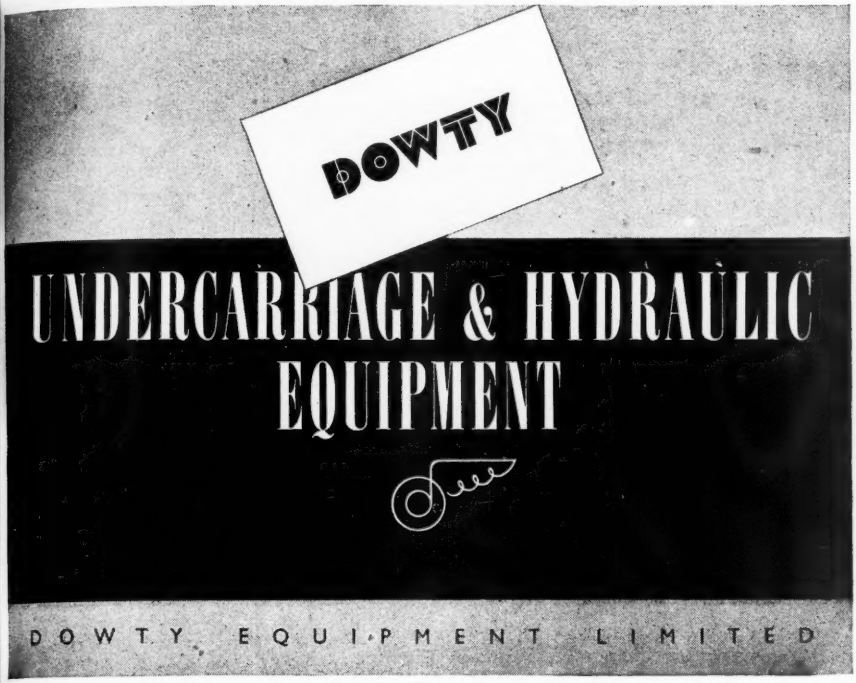
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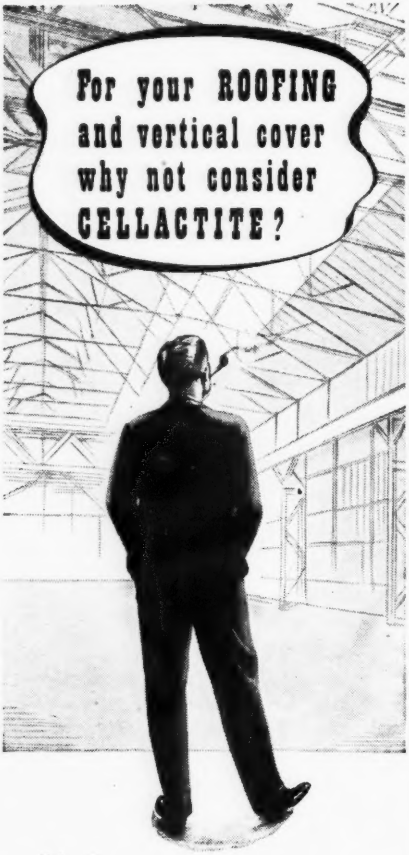

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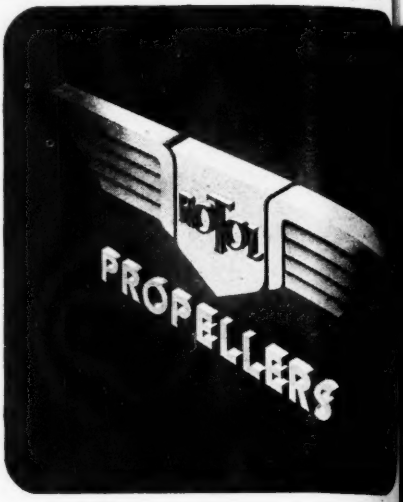

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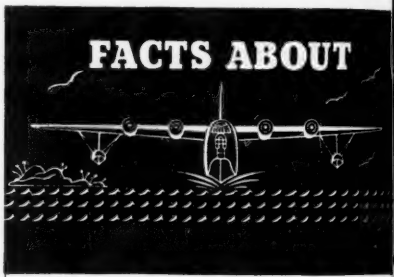

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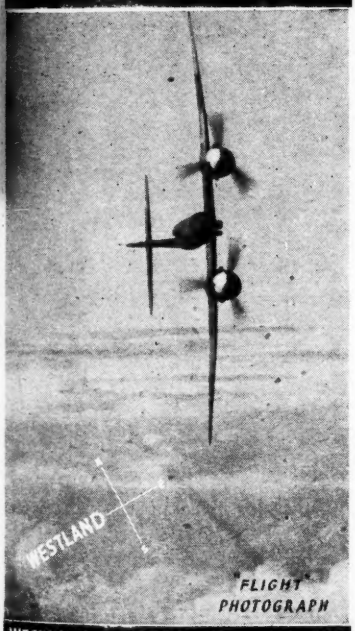

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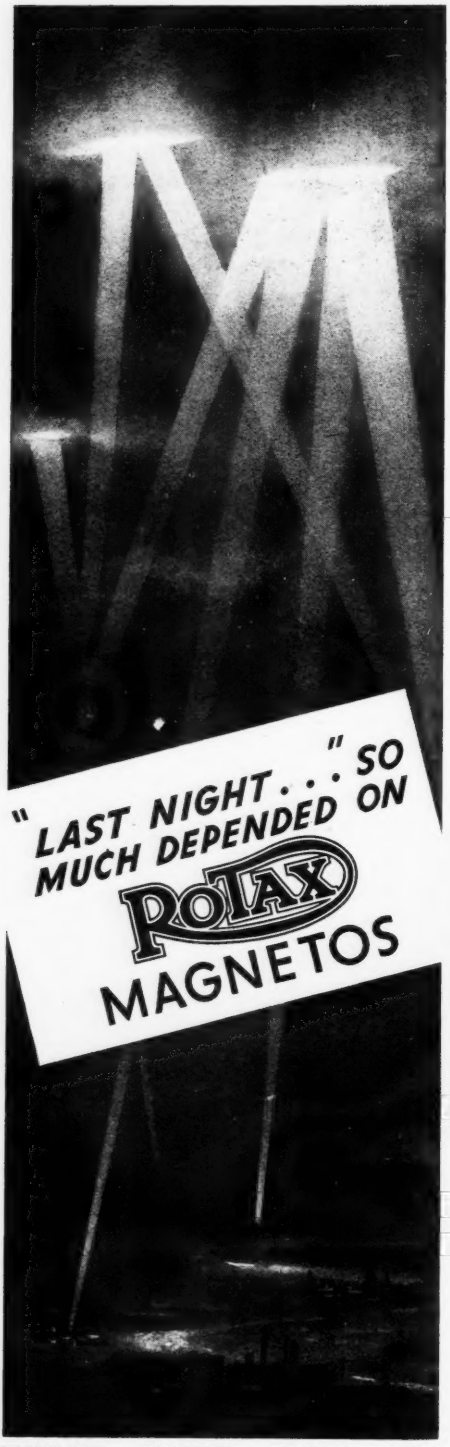

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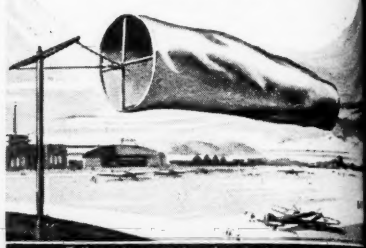
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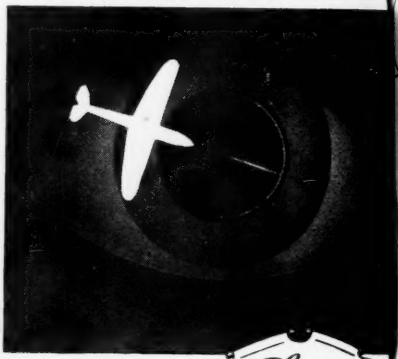
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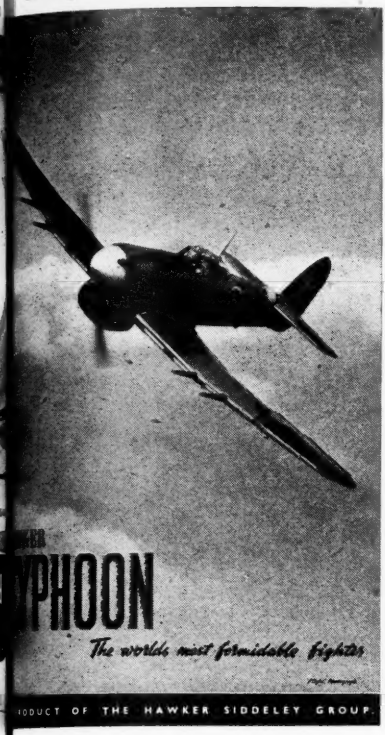

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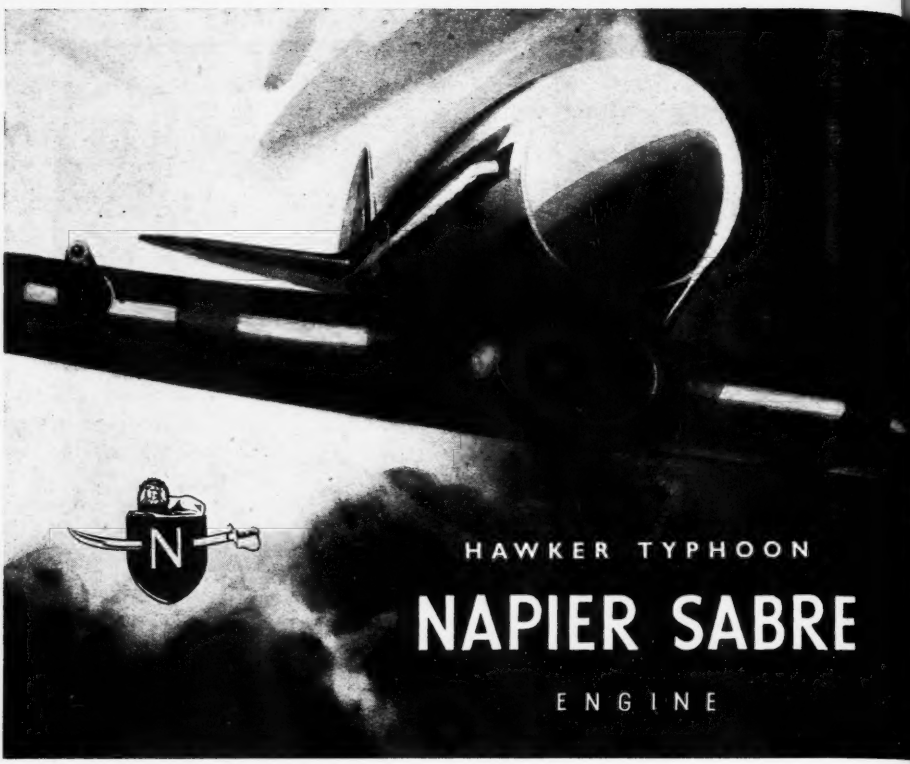

Who's dropped a brick?

This brilliant "take off" at Whipsnade was, on highest autnority, caused by accidental dropping of a Railway-acquired Sandwich by a certain airman on the trail of a certain ME.—just stooging around. Speaking personally—we have always been more interested in upward progress ad astra than in the law of gravity ad terram.

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THE JOURNAL OF THE ROYAL AERONAUTICAL SOCIETY *was founded in* 1897 *in succession to the* ANNUAL REPORTS.

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PRINCIPAL DECEMBER CONTENTS:

The Lateral Stability of Aircraft. (*Concluded.*) H. L. Price.
Airscrew Blade Twist Effects. J. Lockwood Taylor.
Rectangular Tubes under Torque. J. Ratzersdorfer.
Sheet Metal Forming and Assembly. W. Schroeder and T. H. Hazlett.

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THE ROYAL AERONAUTICAL SOCIETY
WITH WHICH IS INCORPORATED THE INSTITUTION OF AERONAUTICAL ENGINEERS

MONTHLY NOTICES

DECEMBER, 1943.

Special General Meeting.

NOTICE IS HEREBY GIVEN that a Special General Meeting under Rules 100 and 101 of the Royal Aeronautical Society with which is incorporated the Institution of Aeronautical Engineers, will be held on Saturday, February 5th, 1944, at 3.0 p.m., in the offices of the Society, No. 4, Hamilton Place, London, W.1, to consider alterations and additions to the Rules.

By Order of the Council,

J. LAURENCE PRITCHARD,

Secretary.

Lectures.

The following lectures have been arranged. They will be delivered at 5.30 p.m. in the Lecture Hall of the Institution of Mechanical Engineers, by kind permission of the Council of the Institution :—

February 10th, 1944.—" Flight Testing Methods," by Mr. E. T. Jones, M.Eng., A.F.R.Ae.S.

February 24th, 1944.—" Structural Features of German Aircraft," by Mr. D. M. A. Leggett, Ph.D., A.F.R.Ae.S., and Mr. H. Davison.

March 9th, 1944.—" Aerodynamic Features of German Aircraft," by Mr. M. B. Morgan, M.A., A.F.R.Ae.S., and Mr. R. Smelt, B.A.

March 23rd, 1944.—" Aircraft Lay-Out Reproduction (Lofting)," by Mr. A. Hessell Tiltman, F.R.Ae. S.

Graduates' and Students' Section.

The following lectures have been arranged by the Graduates' and Students' Section. They will be delivered in the Library at 4, Hamilton Place, London, W.1, at 7.30 p.m. :—

December 8th, 1943.—Mr. K. G. Wilkinson on " Gliding and Gliders."

December 15th, 1943.—Section Discussion on the " Training of Aeronautical Engineers." (Chairman: Dr. H. Roxbee Cox, F.R.Ae.S.)

January 6th, 1944.—Commodore G. d'Erlanger on " Technical Problems in the Conversions of Military Aircraft to Civil Use."

January 12th, 1944.—Captain J. Laurence Pritchard, Hon. F.R.Ae.S., " The History of the Royal Aeronautical Society."

Library Opening.

The Library is normally open on Mondays-Fridays from 9.30 a.m.—5 p.m., Saturdays 9.30 a.m.—12.30 p.m. The number of members using the Library on Saturday afternoons does not justify the continuation of the arrangement of opening on that afternoon. The Library and Offices of the Society will be closed on Friday evening, December 24th, until Tuesday morning December 28th.

Annual Subscriptions of Members.

Members are reminded that their 1944 subscriptions will become due on 1st January, 1944.

The Council are very grateful to all those members who have offered to forego their Journals for the duration of the war. The same reductions will be made to the 1944 subscriptions of these members as applied to the 1943 subscriptions. Subscriptions of Fellows, Associate Fellows, Graduates, Companions and Founder Members, who have given up their Journals will therefore be reduced by 10s. 6d. Associates will receive the reduction already laid down in the Rules and the low subscription at present paid by Students does not permit any reduction to be made.

The following will be the rates for 1944 therefore:—

	Home receiving Journal.	Home not receiving Journal.	Abroad receiving Journal.	Abroad not receiving Journal.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.
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Fellows	4 4 0	3 13 6	3 3 0	2 12 6
Associate Fellows	3 3 0	2 12 6	2 2 0	1 11 6
Associates	2 2 0	1 1 0	2 2 0	1 1 0
Graduates (age 21-25) ...	2 2 0	1 11 6	2 2 0	1 11 6
,, (age 26-28) ...	2 12 6	2 2 0	2 12 6	2 2 0
Students	1 1 0	1 1 0	1 1 0	1 1 0
Companions	2 2 0	1 11 6	2 2 0	1 11 6

Election of Members.

Associate Fellows.—Gilbert George Chamberlain, Ernest Dickerson, Charles Ramsay Dunn (from Student), Thomas George Griffiths, Jesse Frederick Gunn, Guest Hake, John Arthur Jacobs (from Graduate), Douglas Malcolm Aufrere Leggett, Kenneth Gerald McCallum, Ronald Edward Holman Pew, John Noel Richmond, Eaton Holroyd Robinson (from Graduate), George Selwood (from Graduate), Edwin Walker Turner, Jack Webb, Mervyn Millington Waghorn (from Graduate).

Associates.—Lawrence Arthur Adams, William Richard Booley, Edward Stanley Bowyer, George Chadwick, William Henry Coates, Albert Edward Cole, John Hugh Forrington, Ernest Henry Freebody, Arnold Hendrik Geudeker, Charles Lindsay Goodacre, Spencer Goodfellow, Stanley Wardell Hunton, Bernard George Lovell Jackman, Mervyn Lambert, Henry Michael March, John Frederick Marsh, Sydney Thomas Melling, George Morgan-Harris, Reginald George Owen, Edwin Hughes Pritchard, John Anthony Mawson Reid (from Student), Peter Thomas Salsbury, Joseph Tudor Samuel, Edward George Smart, George Stables, Murley Tomlinson, Leonard George Arthur Turner, Robin George Winder, Sydney Yeomans.

Graduates.—William Herbert Brown (from Student), Ivor Robert Daniel Carroll, Thomas Churchill, George Alexander Crook, Raymond Vincent Cudmore (from Student), Dennis Sidney Eburne, Alfred Edels (from Student), John George Gill, William Sowden Jones (from Student), William Alfred Clifford Kendall, Geoffrey Michael Lilley, Roy Hume Long (from Student), Norman Spencer Makins (from Student), Jiri Mraz (from Student), John Philipp Milford Reid (from Student), Maurice Albert Taunton, Norman Arthur White (from Student).

Students.—Alec Field Atkin, Gordon Bales, Frank Harry Bond, Ronald Claude Graham Boxer, Francis Frederick Chamberlain, Eric Alan Coates, John Leslie Cullen, Geoffrey Townsend Dobson, David Hallowell Earle, Anthony Alexander James Fewing, James Fletcher,

Peter Kenneth Franklin, Norman Bryan Goodsell, Stuart William Greenwood, Reginald Alan Hedge, Thomas William Horn, Michael Lee House, Paul William Jenner, Charles Henry Jenno, Leonard Koller, Edwin Le Marquand, D. J. McChesney, Malcolm Neil Lethieullier, Julian Lowe, Eric Ransom Murray, Denis Roland Murrin, Thomas Dixon Nisbet, Eric Norman-Wilson, George Sydney Perdue, Frank Alan Quarterman, John Radford, Hector McDonald Roberts, Ivor Schofield, Leslie Herbert Steele, Peter John Stock, Geoffrey Robert Veale, Joseph Waters, Walter Peter Charles West, Robert Lindsay Whiteley, Michael George Wilde.

Companions.—William Newman Alcock, Arthur Percival Jacksey, Hew Ross Kilner, Joseph Gibson, William McHarry, Joseph Forster Mather.

Branch Prize.

The Council offer an annual prize of twenty guineas for the best paper read before the Branches during the previous lecture Session. The prize is open to any member of the Society or of a Branch. Full particulars of the conditions attaching to this award may be obtained from the Secretary of the Society.

Associate Fellowship Examinations.

The Associate Fellowship Examinations will be held on December 14th, 15th and 16th, 1943. Full particulars have been sent to individual candidates.

Additions to Library.

Pamphlets in italics with location reference following in brackets.
Books marked * or ** may not be taken out on loan.

*A.a.299.—Boundary Layer Problems in the Atmosphere and Ocean. C. G. Rossby and others. Annals of the New York Academy of Sciences, Vol. XLIV, Art. 1. 1943.

B.a.292.—*New Moulded Plastic Plywood Plane. Langley Aviation Corporation, U.S.A. (Press Release.)* 1943. (Y.3.ii.L.)

BB.b.106.—Airframe Construction and Repair (Metal Stressed-Skin Aircraft). John T. Henshaw. Sir Isaac Pitman and Sons. 1943. 7/6.

C.f.26.—*Baling Out. C. G. Grey. (Illustrated article on Parachutes.) "The Sphere," Feb. 24th,* 1940. (Y.2.d.6.)

*D.a.A.21.—*Operating and Expense Statistics of Domestic (U.S.A.) Air Carriers.* 1942-1943. *U.S. Civil Aeronautics Board,* 1943. (File Case.)

E.b.94.—*A Two-Dimensional Approach to Three-Dimensional Framework Problems. H. Roxbee-Cox. London Mathematical Society. (Extract from Vol. XVIII, pp. 21-23,* 1943.) (Y.8.a.22.)

E.f.102.—The Aviation Mechanic. Carl Norcross and J. D. Quinn. McGraw Hill. 1941. 21/-.

EE.h.10.—*Lonsdale-Hands Jet Propulsion Aircraft. (Project.) Lonsdale-Hands Administration. (Stencil.)* 1943. (Y.3.ii.L.)

EE.j.37.—*Metallurgical Investigations of some Light Alloy Pistons from German Aircraft. Dr. C. Wilson. High Duty Alloys, Ltd. (Stencil.)* 1943. (Y.7.a.13.)

*G.e.E.61.—Review of the Work of the Joint Research Committees (1924-1943) of the Iron and Steel Institute and the British Iron and Steel Federation. Iron and Steel Institute. 1943.

*L.a.46.—*Fundamentals of Elementary Flight Maneuvers. (Civil Aeronautics Bulletin No. 32.) U.S Govt. Printing Office, Washington.* 1943. (Y.37.)

*L.d.96.—*Practical Air Navigation. (Civil Aeronautics Bulletin No. 24.) Thoburn C. Lyon. U.S. Govt. Printing Office, Washington.* 1940. (Y.37.)

N.c.13.—The Chemical Background for Engine Research. R. E. Burk and O. Grummitt. Interscience Publications, New York. $3.50.

*Q.a.149.—*An Aeronautical Reference Library. (List of recommended books.) W. Kelso Dennis. Special Libraries Association, New York.* 1943. (PQ.1.a.10.)

*Q.a.150.—Handbook of British Standards, No. 1, 1943. British Standards Institution. 1943. 1/6.

*Q.c.41.—Imperial College of Science and Technology Calendar, 1943-1944. H.M.S.O. 1943.

Q.d.18.—*Cargo Ships and Propelling Machinery adapted to War Conditions. W. S. Burn. Institute of Marine Engineers.* 1943. (Y.17.S.)

**R.a.27.—*An Aerial Race between a Briton and a German. R. Owen Cambridge. Chiswick Press.* 1918. (*Reprinted extracts from a mock-heroic poem: "The Scribleriad," published* 1751.)

**R.b.247.—La Navigation Aérienne. Arthur Mangin. (2nd Edition.) A. Mame et Cie., Tours. 1856.

**R.b.248.—Curso Elemental de Mecanica. Ch. Delaunay. Bailly-Baillière, Madrid. 1873.

**R.b.249.—Ballon d'Essais: Ballon Perdu. L. Armand-Gouffé. Librairie Capelle, Paris. 1802. (Two collections of light verse bound in one volume.)

**R.b.250.—Wax Vesta Matchbox with Balloon Pictures. Roche et Cie., Marseilles. (ca. 1870.)

R.f.91.—*Aerial Navigation and its Development. Francis Jaffé.* (*Article in "The Far Eastern Engineer," June,* 1943.) (Y.11.iv.a.26.)

S.e.71.—The Last Enemy. Richard Hillary. Macmillan and Co. 1943. 7/6.

*S.e.72.—*Biennial Report of the Chief of Staff of the United States Army, July 1, 1941, to June 30, 1943, to the Secretary of War. U.S. Govt. Printing Office, Washington.* (*Reprinted by H.M.S.O.* 1943. 2/-. (Y.37.)

*S.e.73.—*The Air Service Command. U.S. Office of War Information.* (*Press release, Sept. 19th,* 1943. *Stencil.*) (Y.37.)

**T.b.90.—*Official Program of arrival at Floyd Bennett Airport of Italian Air Armada (Balbo). Isaac Goldman, New York (Printers).* 1933.

*UU.c.—*National Advisory Committee for Aeronautics (U.S.A.): Technical Memoranda:*—

No. 1040, Piezoelectric Instruments of High Natural Frequency Vibration Characteristics and Protection against Interference by Mass Forces. Werner Gohlke. (V.D.I. Forschungsheft 407, March-April, 1941.)

No. 1050, Heat Transfer over the Circumference of a Heated Cylinder in Transverse Flow. E. Schmidt and K. Wenner. (F.G.I. March-April, 1941.)

*X.c.M.23.—H.Q. Army Air Forces Dictionary of Aeronautical Terms: English, Japanese, French, German. Intelligence Service, Washington. 1942.

J. Laurence Pritchard, *Secretary & Editor.*

THE DEVELOPMENT OF JET OR ROCKET PROPULSION.*

J. STEMMER.

Flug.-u. Wehr Technik, Vol. 3, Nos. 7-8, July-Aug., 1941,
pp. 166-170 and 191-195.

Translated by V. P. Akimoff.

1. HISTORICAL DEVELOPMENT.

The rocket goes far back into history. In the Thirty Years' War, it played a conspicuous part in the capture of Philippsburg in 1645. During the Napoleonic Wars, General Congreve used rocket projectiles to force the fall of Boulogne (1806) and of Copenhagen (1807). The latter town, for instance, received a total of 120,000 rockets. It may be concluded, therefore, that in former times, this type of projectile must have played the part of modern artillery.

The performance of the gunpowder rocket of the 18th and 19th centuries may be gathered from the following short table:—

CONGREVE ROCKETS.

Calibre (cm.)	Weight (kg.)	Range (m.)
5, 8, 12.	6, 7, 16, 24.	2,000, 2,500, 2,800.

The rockets most widely used were the 32-pounders. They served to carry explosive charges weighing from 8 to 10 and 20 lbs. From 1820 to 1840, these charges were conveyed to distances from 2,000 to 3,500 m. by much improved rockets.

With the appearance, in the 19th century, of rifled guns, the importance of the rocket in war steadily declined. Instead, it began to be developed for scientific purposes, and also as a life-saving, signalling, and hail-dispelling device, and also as a flare.

The life-saving rocket is used to carry a long line from the shore or from another vessel to a stranded ship or vice-versa. A stout cable is then hauled in with this line, and is used for the safe transfer of persons or valuable goods from the distressed ship.

The hail-dispelling rocket deserves special mention, since it is still in use in Switzerland. It owes much of its development to the success achieved in weather-shooting experiments with a specially constructed gun. The best results were obtained by the Swiss pyrotechnist Müller, of Emmishofen, whose rockets rose to a height of 1,200 m. This type of rocket is still employed in many places for the following purpose.

When a rocket is discharged against a forming hailstorm, the air currents set up by the explosion cause the transformation of the hailstones into snow-flakes, which then resolve into rain after the second or third explosion. The range of action of one rocket extends over an area of about 1 km.^{2}. The calibre of such rockets is usually from 3 to 4 cm., and their length 25 to 35 cm. The propulsive charge (black gunpowder) is compressed in a cardboard cartridge case.

The study of the reaction problem proper entered a new phase of development in 1919 and 1921. Professor Goddard, of Clark College, Worcester, U.S.A., at that time published a sensational paper, entitled "A Method of Reaching Extreme Altitudes," dealing with high efficiency rockets. This was the first

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*L.d.96.—*Practical Air Navigation. (Civil Aeronautics Bulletin No. 24.) Thoburn C. Lyon. U.S. Govt. Printing Office, Washington.* 1940. (Y.37.)

N.c.13.—The Chemical Background for Engine Research. R. E. Burk and O. Grummitt. Interscience Publications, New York. $3.50.

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attempt to approach the problem from a scientific standpoint, and served to give the impulse to the development of a new science.

2. The Law of Rocket Propulsion.

The term rocket or jet-propelled apparatus applies to any device, from an opening in which a compressed gas or liquid under pressure escapes at high velocity, this producing a reactive or recoil force. This process can best be visualised as follows:—

Let a gas under pressure be contained in a hermetically sealed cylinder.

The gas consists of separate molecules which are so small as to be invisible; they are, however, imagined as spherical. There exists a stress or pressure between the individual molecules or small spheres. Consequently, the cylinder contains great energy forces acting uniformly on its walls. It is obvious that these forces will act also in the absence of the air surrounding the cylinder. So long as the cylinder remains closed, there will be a state of equilibrium. But if one of the cylinder walls is removed, the separate gas molecules will escape at high velocity under the effect of the pressure acting between them, and the fundamental physical law of " action and reaction " then comes into force. This law holds also in a vacuum; the practical significance of this fact is that, with a jet-propelled apparatus we can fly up to unlimited heights, *e.g.*, into the stratosphere or even the inter-planetary space, since the gas will continue to flow out of the cylinder even in the absence of surrounding air. The gas molecules are not repelled by the air, but by the equivalent spring action between the individual molecules being relieved in the direction of the opening in the cylinder. This expansion, obviously, is propagated to the back wall of the cylinder, which is thus repelled. Actually, this reaction occurs in the nozzle, if such a nozzle was fitted to the cylinder opening. We shall return to this nozzle in greater detail further below.

These conclusions also apply to the black powder rocket, which also acts in a vacuum. It is often objected that free oxygen or air is indispensable for the combustion which takes place in the rocket; this, however, is not true, since the powder used consists of sulphur, carbon and nitre. Nitre supplies the oxygen required; and combustion is, therefore, possible in vacuum. With the liquid jet-propulsion apparatus, in which the liquid fuel is gasified, oxygen must be carried to form an ignitible fuel mixture.

Thus, the action of the rocket is based on the principle of reaction propulsion. This principle is a special case of fixation of the centre of gravity which is itself based on the third Newtonian fundamental law, according to which every force is opposed by a counter force of the same magnitude. Thus, a force is required to drive the gases out of the cylinder or rocket case, but this force is opposed by an equal counter force acting on the cylinder. The reactive effect is best illustrated by what happens in a gun. The " impulse theorem," which applies to all shock phenomena, may be derived from the Newtonian equation of motion. When the powder charge in the gun explodes, the resulting gas pressure propagates uniformly in all directions, and expels the projectile out of the gun barrel.

Let

M_G = mass of the gun;
V_G = recoil velocity of the gun;
m_{ge} = mass of the projectile;
v_{ge} = velocity of the projectile;
b_{Ge} = acceleration of the gun;
b_{ge} = acceleration of the projectile.

An equal force K acts on both masses at the instant of explosion.

$$K_G = M_G \cdot b_G$$
$$K_g = m_{ge} \cdot b_{ge}$$

and therefore

$$M_G \cdot b_G = m_{ge} \cdot b_{ge}$$

whence we get

$$\frac{b_{ge}}{b_G} = \frac{M_G}{m_{ge}}$$

The terminal velocities of gun and projectile give the acceleration ratio :—

$$\frac{V_G}{v_{ge}} = \frac{b_G}{b_{ge}}$$

and thus

$$M_G \cdot V_G = m_{ge} \cdot v_{ge}$$

This expression represents the impulse theorem ; it is of fundamental importance in the reaction theory, because it clearly defines the reactive effect.

Returning now to our gas cylinder, and applying the impulse theorem to it, let us now imagine the cylinder as a large sphere, and the escaping gas as a small sphere.

Now, any desired velocity can be imparted to the smaller sphere by increasing the mass ratio M/m.

Let us imagine, in a space free from air and gravitational force, a body which is split by an explosive charge into two equal parts. These parts fly apart with the explosive velocity c. The velocity of each individual part, in relation to the common centre of gravity, will be :—

$$v_1 = \frac{c}{2}$$

The body, as a whole, may well be conceived in the form of a rocket, one half of which contains a passenger cabin. After the first explosion, the part with the cabin will, therefore, also move at a velocity of $c/2$. Now, let a further portion $1/n$ be split off this half, when the part with the cabin will be given the additional velocity $(1/n)\,c$.

Thus, the total velocity will be :—

$$v_2 = \left(\frac{2}{n}\right)c$$

and, after the K-th split off, the total velocity of our part will be :—

$$v_k = \left(\frac{k}{n}\right)c$$

If the initial velocity were v_o, then the different velocities which can be attained after, let us say, four divisions, will be :—

1st Division :— $v_1 = v_o + \frac{c}{2}$

2nd Division :— $v_2 = v_o + \frac{c}{2} + \frac{c}{2} = v_o + c$

3rd Division :— $v_3 = v_o + \frac{c}{2} + \frac{c}{2} + \frac{c}{2} = v_o + \frac{3}{2} \cdot c$

4th Division :— $v_4 = v_o + \frac{c}{2} + \frac{c}{2} + \frac{c}{2} + \frac{c}{2} = v_o + 2c$

Generalising, after an arbitrary number, *e.g.*, n divisions, the velocity will be :—

$$v_n = v_o + \left(\frac{n}{2}\right)c$$

From this, we see again that the ever decreasing portion (at its smallest after the nth division) can attain any given terminal velocity.

With regard to the mass remaining after each successive division, the question now arises of the number of times the division can be repeated in time. The

reduction in the mass resulting from each division obeys the following law:—

After the 1st division $M_1 = \frac{1}{2} \cdot M_0$
After the 2nd division $M_2 = \frac{1}{4} \cdot M_0$
After the 3rd division $M_3 = \frac{1}{8} \cdot M_0$
After the 4th division $M_4 = \frac{1}{16} \cdot M_0$

i.e., after the nth division, the remaining mass will be:—

$$M_n = \left(\frac{1}{2^n}\right) M_0$$

If, for instance, a spatial velocity of 11.2 km./sec. (necessary to overcome gravity) is to be reached, a 100-fold division might perhaps be still practically possible, this figure being, of course, quite arbitrary. Under these conditions, what would be the residual mass containing the cabin?

After the 100th division, the remaining mass will be

$$M_{100} = \left(\frac{1}{2^{100}}\right) M_0$$

i.e., 2^{100}=one quintillon and 269 quadrillions—a figure which is quite beyond our comprehension. If, for instance, the initial mass were the size of the earth, the remainder after the last division would be no more than 1/2000th of a gramme. The whole problem of rocket flight at very high velocities, such as are necessary, for instance, to leave the earth, would thus seem to break down on this simple fact. Nevertheless, it is possible to attain our purpose, as will be shown by the following considerations.

In conducting these investigations, it is most important to realize that, provided the initial mass is made sufficiently large, it is possible to detach from it a 1/nth part of the respective residual mass not only n times, but any given larger number of times. This 1/nth part can be made very small, the smaller the less residual mass, since it will always be possible theoretically (and, within certain limits, also practically) to detach a further portion from the latter—until the splitting of the atom is reached. Consequently, k (number of divisions) can be larger than n. From this results the extremely important fact that the "velocity of projection" d can be indefinitely exceeded. Assuming, for instance, that this velocity is 2,000 m./sec. (corresponding approximately to the velocity of discharge of a good powder gas), and that 1/100th part of the remaining mass is continuously detached, at the end of 560 divisions the velocity will be 11.2 km./sec.

$$V_x = \frac{560}{100} \times 200 = 11{,}200 \text{ m./sec.}$$

In addition to the above considerations, it should also be remembered that the acceleration per second depends on the time intervals at which the divisions are made. Assuming that 1/nth part of the remaining mass is detached f times per second, the acceleration in this unit of time will be:—

$$b = \frac{f}{n} c$$

The degree of acceleration will always have to be determined in advance in the case of reaction propulsion. Thus, the number of divisions will be:—

$$f = \frac{b}{c} n$$

A man of average build can safely stand for a short time an acceleration of 30 m./sec. From this we get:—

$$f = \left(\frac{v}{c}\right) n = \left(\frac{30}{2000}\right) 100 = 1.5$$

It follows that, to ensure tolerable conditions in a jet-propelled apparatus operating with a gas discharge velocity of 2,000 m./sec., a rate of 1.5 projections per second from the residual will be still permissible. This, however,

would mean an intermittent working of the jet-power unit which, furthermore, is unavoidable if separate powder rocket elements are used. But, in consideration of the strength of the whole structure, and of the adjustment of the human organism to these flying conditions, we must, of necessity try to have a continuous working of the jet power unit. The particles (gas molecules) projected must be made to escape in a regular stream, and it should be possible in this way to reach the required acceleration.

The mass m which will then escape per second, can be obtained from

$$m=\left(\frac{b}{c}\right)M$$

where M represents the total mass available at each projection. In the case of the above examples we get

$$m=\left(\frac{30}{2000}\right)M$$

i.e. 1/150th of the available mass M must escape per second. The realization of travelling in space is still a matter for the future, since the jet-power plant has yet to be developed.

We shall now examine more closely the question of whether the discharge of small fractions, as specified in the case of the jet-power plant described below, is more favourable for the expenditure of the initial mass than the discharge of larger portions (*e.g.*, $M/2$ as in the above first example of division).

Let M be the initial mass, and $1/n$ the fraction of the residual mass which is discharged. After the first division, the remaining mass will be:—

$$M_1=M-\left(\frac{1}{n}\right)M=\left\{\frac{(n-1)}{n}\right\}M$$

and after the second division

$$M_2=\left(\frac{(n-1)}{n}\right)M_1=\left\{\frac{(n-1)}{n}\right\}^2M$$

After f discharges, the residual mass M_f will be

$$M_f=\left\{\frac{(n-1)}{n}\right\}^f M$$

As in the first example, the velocity attained after f discharges, will be given by

$$v_f=\left(\frac{f}{n}\right)c$$

where c, n and v are predetermined. Consequently, the number of discharges required will be

$$f=n\left(\frac{v}{c}\right)$$

The final residual mass will then be

$$M_0=\left\{\frac{(n-1)}{n}\right\}^{n(v/c)}M$$

Again putting, as in the first example, $1/n=\frac{1}{2}$, and setting up the requirement that the velocity v should be equal to the outflow velocity c, the residual mass will be:—

$$M_0=(\tfrac{1}{2})^2\,M=0.25\,M$$

If, now, $1/n$ is made smaller (*e.g.*, $\frac{1}{4}$), when $v=c$, we get:—

$$M_0=\left(\frac{4-1}{4}\right)^4 M=0.32\,M$$

For *continuous outflow*, which is comparable with the discharge of infinitely small fractions, we have

$$\frac{1}{n}=\frac{1}{\infty}$$

and hence

$$M_o = \left(\frac{\infty - 1}{\infty}\right)^{\infty} M$$

The numerical value of this expression is :—

$$M_o = \left(\frac{1}{e}\right) M = 0.368\, M$$

where e is the base of the natural logarithms.

This formula indicates that when, in continuous emission (outflow), the velocity of outflow c is reached, there will still remain 36.8 per cent. of the initial mass, whilst in the case of $1/n = \frac{1}{2}$, the residual mass would only be 25 per cent.

The question now arises, what will be the residual mass corresponding to any given high value of velocity? Let

$$M_o = \left\{\frac{(n-1)}{n}\right\}^{n(v/c)} M$$

Introducing the relation $a^{x \cdot y} = (a^x)^y$, this formula can be written :—

$$M_o = \left[\left\{\frac{(n-1)}{n}\right\}^{n}\right]^{(v/c)} M$$

But for continuous outflow we have to put $n = \infty$, and thus

$$\left\{\frac{(n-1)}{n}\right\}^{n} = \frac{1}{e}$$

and consequently

$$M_o = \left(\frac{1}{e}\right)^{(v/c)} . M = \frac{M}{e^{(v/c)}}$$

The ultimate residual mass will practically consist of the empty envelope and the useful load of the jet-propelled aircraft. From this we can calculate the initial mass which will be required to reach any given velocity, using continuous outflow. (This method is much easier to realise in practice than is the task, for instance, of solving the mass division problem by way of the intermittent ignition of single reaction units.) We get then the fundamental formula

$$M = M_o . e^{(v/c)}$$

From this, introducing the mass ratio m_{aa}/m_r, where m_{aa} = total initial mass, and m_r = mass of the empty jet-propelled apparatus, we obtain inversely the maximum terminal velocity

$$V_{max} = c . \log\left[1 - \left(\frac{m_{aa}}{m_r}\right)\right]$$

This relation is of fundamental importance for the jet-propulsion problem, and may also be derived from the impulse theorem. The corresponding differential equation is

$$(m_r + m_a) . dV = -c . dm$$

and, by integration :—

$$\int \frac{dV}{c} = -\int \frac{dm_a}{(m_r + m_a)} + C$$

where m_a = reaction mass not yet expelled. Consequently

$$V/c = -\log (m_r + m_a) + C$$

Before the first explosion $m_a = m_{aa}$ and $v = o$, whence

$$C = +\log (m_r + m_{aa})$$

Therefore, at any instant of time :—

$$V = c . \log\left\{\frac{(m_r + m_{aa})}{(m_r + m_a)}\right\}$$

from which V_{max} can be calculated when $m_a = o$, *i.e.*, at the end of the propulsion period.

As we shall see in a section further on, for the flight of a jet-propelled aircraft from Europe to America, the maximum velocity should be $v = 2{,}000$ m./sec. $= 7{,}200$ km./h. The outflow velocity of the gas would be 3,000 m./sec.

Hence, the initial mass will be:—

$$M = M_0 \cdot 2.72 \cdot \frac{2{,}000}{3{,}000} = M_0 \cdot 2.72^{0.665} = 2 \cdot M_0$$

Consequently, the propellant to be carried must be twice the empty weight of the aircraft (the empty weight is understood to include the envelope + the power unit + the useful load).

The propulsive force of a jet-propelled apparatus will be greater:—

1. The greater the outflow velocity c of the fuel mixture and
2. The larger the ratio of the initial to the ultimate residual mass.

Travel through cosmic space cannot be envisaged within reasonable time, and for the first long distance flights, the mass ratio will not be of such predominant importance.

The following considerations deal with the mode of operation of a jet-power plant using liquid fuel, and indicate its great advantages over the powder rocket, especially from the point of view of the main requirement of high outflow velocities.

3. Jet-Propulsion as the Motive Power of a Motor Car or Aircraft.

When the powder charge of a rocket is ignited, it burns until nothing more remains of it. One of the main drawbacks of this method is the impossibility of mechanically controlling the combustion, *i.e.*, of regulating the propulsive force which is a principal requirement in modern engine design.

Let us now examine the further performance possibilities of the powder rocket. In general, the jet engine performance is given not in h.p. but in kg. of thrust, since the underlying principle is that of action and reaction. A force is required to expel the gas out of the cylinder; this force is represented by the gas pressure which is measured in kg./cm.^{2}. The thrust is equal to the momentum of the cylinder which is propelled in the opposite direction. The cylinder may be prevented from moving, which enables us to measure the reactive force with a dynamometer.

In life-saving and hail-dispelling rockets, the rockets have a discharge nozzle for the escaping gases, by suitable modification of which we can considerably increase the outflow velocity. In modern firework rockets, the nozzle is represented by a short constriction in the passage; in these rockets, the outflow velocity c is from about 400 to 600 m./sec. The powder rocket was intensively studied by Goddard, who investigated the properties of various types of powder, with special reference to the nozzle problem. The following table gives the optimum values obtained from a long series of tests:—

	Outflow velocity in m./secs.
Ordinary powder used for the Coston-Schip rocket ...	1,600
Pistol powder No. 3 of the Dupont Powder Co.	2,290
Smokeless " Infallible " powder	2,434

According to Goddard, the most effective nozzles are long conical apertures, of the type of the Laval turbine nozzles. The outflow velocities obtained with them are, however, low in comparison to those obtainable with jet-engines working on liquid fuel; in addition, work with powder rockets is not always safe, and efficient presses of several tons power are required to compress the powder charges.

From all these drawbacks, it is obvious that the powder rocket cannot be taken into serious consideration for the solution of the jet-propulsion problem. The present endeavour, therefore, is directed to designing a controllable rocket engine which will be as reliable in action as an ordinary internal combustion engine.

The possibility of mechanically regulating the fuel supply enables us to vary widely the performance under all conditions.

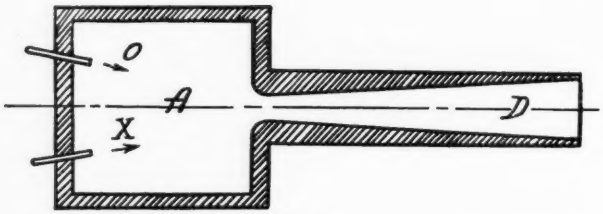

FIG. 1.

Principle of the jet.

Such an engine is represented diagrammatically in Fig. 1. It consists of a combustion chamber with a conical nozzle for the expansion of the gases. The fuel, *e.g.*, petrol, alcohol or hydrogen, is introduced through one feed pipe, and the oxygen required for combustion through the other pipe; ignition may be effected electrically. As in the modern internal combustion engine, considerable importance is attached here to the method of fuel injection and atomization. But a detailed discussion of all the various factors would be beyond the scope of this article. The purpose of the nozzle is to enable complete expansion of the combustion gases escaping at high velocity; this velocity is of decisive importance and constitutes the essential point of the whole problem. It depends on the pressure ratio, the specific heat ratio, and absolute temperature, as well as on the gas constants. The reader specially interested in these questions is referred to the relevant literature on thermodynamics (*e.g.*, Schüle's Thermodynamics).

The fuel mixture also plays an important part. Here again, the conditions governing the admixture of air or pure oxygen are essentially different from those in the ordinary internal combustion engine. However simple the external design of the jet engine, the internal combustion and gas escape phenomena involved are all the more complicated.

Another point of interest, in this connection, is the question of efficiency which, indeed, is the best criterion by which we may form an opinion of the new engine. Closer study of this problem shows that the efficiency factor can be defined in various ways.

The question of efficiency was studied in detail by Dr. Sänger in his book (*cf.* bibliography).

The problem can best be visualized by comparing the jet-engine with the standard petrol engine. Like the latter, including the whole transmission gear, but excluding the airscrew, the jet-engine may also be assumed to have "internal efficiency." This arises from the practical imperfections of the plant, and is represented by the ratio of the energy obtained from the engine to the thermal energy of the fuel used. The fact that to-day, the maximum internal efficiency obtainable from the internal combustion engine is only 30 to 35 per cent., is due to the following inherent faults:—

	Fuel energy.
1. Chemical losses due to incomplete combustion owing to bad mixing and lack of oxygen	about 5%
2. Losses of fuel caused by scavenging with fresh gases ...	—
3. Losses due to the time required for combustion which is not limited to the dead centre of the crank	—
4. Losses of heat due to the walls	about 15%
5. Losses due to leakage in the piston	—
6. Gas flow losses due to leakage of pipes, mixing nozzles, pumps, etc.	about 5%
7. Frictional losses in the whole transmission gear	about 15%

	Fuel energy.
8. Exhaust losses through incomplete combustion and cooling of the exhaust gases	about 30%
Total losses	about 70%

The well-known efficiency factor $\eta = 0.30$ to 0.35 per cent. of the internal combustion engine is based on the above table.

In the light of the investigations so far made, these losses in the jet-engine may be summarized as follows:—

The losses No. 1 are of approximately the same magnitude as above.

Losses Nos. 2, 3, 4 and 5 do not occur at all since, as we have seen, the jet-engine has no pistons, and the heat given out to the walls is used for pre-heating the fuel.

Loss No. 6 may be assessed at about 3 per cent.

Loss No. 7 is also completely eliminated by the construction.

The losses No. 8 are just as essentially important in the jet-engine as in the internal combustion engine. We can, however, in a large measure control directly the combustion, and the expansion and terminal temperatures are but a question of the length of nozzle which also can be varied within wide limits. (In full size engines, these losses will be less than in the tests which have so far been made on experimental models.) According to the author's own measurements, the total of losses No. 8 may be estimated at 10 to 15 per cent.

There are no further loss factors in the jet-engine, so that the total loss in it may be put as 18 to 23 per cent., the mean value of η becoming 80 per cent.

Sänger defines internal efficiency graphically as the square of the ratio of the actual discharge velocity of the combustion gases to the theoretical. This value, therefore, represents a fixed valuation standard.

Using a mixture of 1 part, in volume, of hydrogen with 2 parts of oxygen, with a calorific power of 1.03×10^6 kgm./kg., Professor Oberth obtained a theoretical gas discharge velocity of 4,470 m./sec., and actually measured 4,000 m./sec., which corresponds to an efficiency of 80.3 per cent., as described above.

Conditions are very different in the case of the so-called *external efficiency* of the jet-engine in flight. Kinetic energy and efficiency, in actual flight, are determined by the speeds attained. This point is also represented very clearly by Sänger, who introduces the ratio of transport work to engine work as a so-called transport efficiency.

In the flying jet-propelled engine, this factor is very variable, but not in the ordinary aircraft which has a more or less constant cruising speed lacking in the former. Consequently, we can only speak, to a certain extent, of a momentary efficiency, corresponding to the flight condition which is being considered.

At lower flying speeds, this factor is very small (2 to 4 per cent., as against 20 per cent. with the ordinary aircraft), but its value increases very considerably at supersonic velocities in empty space, where it may reach as much as 50 per cent. This figure includes the effects of the unfavourable conditions in climbing through the atmosphere, and also of the conditions of acceleration imposed by physiological considerations.

These external relationships depend to a very great extent on the nature of the climbing path of this type of jet-propelled aircraft. It follows from this, further, that jet-propelled flight in the atmosphere would be just as uneconomical as, for instance, rocket propulsion of land vehicles. But the above considerations on the working conditions of the rocket in flight also have their weak point, in that they do not take into account the considerable run out or gliding stretches which will form by far the greatest portion of the whole trajectory in practice. Of decisive importance in the matter may well be the very great economy in time and fuel which jet-propelled aircraft will enable us to realise.

The fact that so little progress has hitherto been made in the solution of this problem, is chiefly due, in the first place, to the rather impracticable way in which the realization of the jet-engine was attempted and, secondly, to the difficulties of construction which were encountered from the first trials, mainly owing to the combustion temperatures.

4. The Latest Researches on the Jet-Propelled Engine.

In his book " Die Rakete zu den Planetenräumen " (By rocket to interplanetary space), Oberth was the first to suggest the use of liquid fuel with jet-engines. The whole problem is dealt with on strictly scientific lines in this work, which gave inspiration to Max Valier, the great Austrian supporter of the jet-engine, to start his researches. It was he who, in collaboration with the automobile manufacturer Otto von Oppel, carried out in 1928 the first public trials with a rocket-propelled car.

The largest car built by von Oppel attained a maximum speed of 236 km./h. on the 23rd May, 1928, on the Avus Course, near Berlin. It was driven by 24 Sander powder rockets, 12 cm. in diameter and 80 cm. long. To prevent the front part of the car from rising during the run (it was very light in weight, owing to the absence of the petrol engine), short wings with a strong negative setting were attached to the sides.

After this, a second car was built to run on rails, but was wrecked during the trials owing to the high speed reached. Finally, Oppel risked making personally a flight in a converted sailplane propelled by powder rockets.

This aircraft covered a distance of 1,400 m. at a maximum speed of 140 km./h. and was also wrecked during the trial flights.

Since Oppel treated the whole matter as an advertisement for his firm, Valier broke off his connection with him, and built his own experimental car, in which liquid fuel was used for the first time. Valier developed a total of seven different cars, with which he obtained valuable practical information about his new engine. The purpose of this research was not the development of a new motor car, but that of the engine itself. Valier was well aware that he could not at that time obtain enough capital for large scale production, and sought to arouse public interest in the problem in this way. Shortly afterwards, however, he was killed in demonstrating his seventh car, the engine of which was driven by liquid oxygen and petrol.

During that same period (up to 1933), the engineer Tilling, of Osnabrück, was experimenting with the so-called powder rocket torpedoes. These rockets reached heights up to 5,000 m. Landing was effected by means of a parachute or wings which opened out automatically on reaching the ceiling. In climbing, the parachute or wings were folded into the stabilizing fins.

Tilling, too, was killed while experimenting in his laboratory.

5. The Latest Italian Experiments.

During last winter reports were received of successful trials in Italy of a jet-propelled aircraft. The motive power was reaction, and was termed hot air jet-propulsion. The oxygen required for the combustion of the fuel (petrol) was obtained from the air; this, obviously, had the advantage of enabling larger fuel supplies to be carried. The principle underlying this type of propulsion may be gathered from Fig. 2.

The engine was designed in 1932 by the Italian Campini who took out a patent for it. The relative wind is passed through a honeycomb scoop fitted around the fuselage, into a centrifugal compressor driven by an engine or a gas turbine. From the compressor, the air stream is steadied by passing through the engine radiator, from which it finally reaches the combustion chamber where it is mixed with the fuel and burnt in an annular space (Venturi tube). The combustion gases are expelled through a nozzle of the same type as that used in other jet-engines.

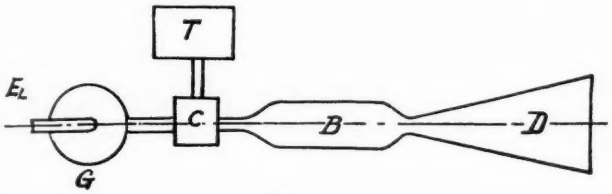

FIG. 2.

Principle of hot air jet propulsion.
G=blower, T fuel container, C mixing and carburation chamber, B combustion chamber, D expansion nozzle.

The aircraft built by the Caproni Works corresponds to this design, except that an ordinary airscrew is used for taking off. In flight, the engine works the blower which compresses and heats the induced air.

Reports state that this aircraft was flown by the test pilot Col. de Bernardis, for 10 mins., during which a speed of 710 km./h. was reached.

6. PERSONAL INVESTIGATIONS.

Up to that time, the author's personal researches had been exclusively directed towards developing an engine for liquid fuels. For this purpose, a test engine was built, with which a first series of experiments were made in 1936. The cylinders of a two-cylinder Mercedes motor car engine were used as the combustion chambers, after suitable modification to incorporate required intake system and expansion nozzles.

The engine was then used for the following investigations:—

Measurement of the reactive force.
Measurement of the discharge velocity of the combustion gases.
Thermal conditions.
Fuel injection and atomization.
Fuel mixtures.
Various types of expansion nozzle.

The reactive force was measured by the simple method of mounting the whole engine, including the pressure bottles and tanks, on a ball-bearing carriage coupled to a dynamometer fixed on the bench. At the beginning of the tests, considerable difficulties were encountered, due to the high temperatures produced, which caused parts of the nozzle and injection system to melt. Cooling was mainly effected by means of a cooling jacket on the cylinder. The fuel itself was mostly used as the internal cooling medium, water being used for this purpose only occasionally.

The fuel mixtures tested were petrol-air, petrol-oxygen, alcohol-oxygen, acetylene-oxygen, and hydrogen-oxygen.

With the exception of acetylene and hydrogen, all fuels were injected in the liquid state. In many of the tests, the oxygen was also injected.

All these experiments involved a great wastage of time because of the modest and rather primitive testing apparatus available. Parallel with these test bench researches, a first series of flight trials was made with a model, the engine of which had been designed from the experience gained. The last flights were made in April, 1941, at Katzensee, near Zurich, and a speed of 193 km./h. was reached. The aircraft model used was provided with a distant control mechanism, a maximum distance of 3.8 km. being actually covered. These test flights were not intended to reach great altitude, and were kept to the horizontal at a maximum height of 50 m. Owing to an error of steering and the failure of the aerial, one landing was made on a mud bank, but two other landings were successfully effected on the water. Very little attention was paid to the aerodynamic properties of this aircraft model.

A larger scale model, with a span of 4.8 m., now being constructed, also designed for landing on water, should have better flying properties; it is intended exclusively for demonstration purposes. At first, it was provided with three small jet-engines, of which the two outside (accommodated in the nacelles) were to be used for steering. Experience during the last flights with the old model indicated, however, that this would involve fairly considerable difficulties. Consequently, the two outside engines were removed and replaced by ordinary control members; the jet-engine is now situated in the middle fuselage. The fuel and oxygen tanks are in the floats, and the controls in the mid-wing section. As a further development, it is intended to build a so-called long range rocket, which should have a range of about 100 to 150 km.

7. Conclusions.

Close study of the principle of the mass ratio outlined above will have shown that the fuel consumption of this type of engine is very heavy, and that, therefore, the engine will not be able to work for hours on end in flight (the first aircraft model consumed 38 gm. per second). But owing to the large power of the engine, the terminal velocity which can be attained in a short time is the decisive factor. The flight of such an apparatus is also fundamentally different from that of an ordinary aircraft. From the take-off, care must be taken that acceleration (*i.e.*, speed increment per unit time) is not excessive, since it is acceleration, and not velocity, which has harmful effects on the human organism. The combustion gases escape with a velocity of 3 to 5 km./sec., which will also be the speed of the aircraft. But, in the case of the jet-engine, we can regulate the inflow of the fuel, and thus reduce the acceleration to a bearable amount. A man of normal build can easily stand an acceleration of as much as 30 m./sec.^{2}, *i.e.*, the aircraft will be able to cover a distance of 30 m. in the first second, 60 m. in the second, 90 m. in the third, and so on. At the end of the first minute, the speed will, therefore, be 1,800 m./sec. = 6,480 km./h.

Now in long distance flights, *e.g.*, from Europe to America, the engine need not work during the whole flight, but only for a very short time. The take-off thus resembles that of a projectile leaving a gun.

At the end of two to five minutes, an aircraft equipped with a jet-engine will have attained a very high terminal velocity. This velocity will be at its maximum at the instant when the engine is cut off. The trajectory begins by rising steeply. When the engine is cut off, the velocity starts to drop at a constant rate owing to the effect of gravity and also at first, to the resistance of the air, with the result that the trajectory becomes flatter. The velocity developed should be sufficient, however, to bring the aircraft to a high altitude, *e.g.*, from 500 to 1,000 km., whilst the engine is only required to run up to a height of 50 to 100 km. On reaching the apex, the aircraft is put into a glide. (The term " glide " is not quite correct, since the flight path is still stabilised by the kinetic energy.) In any case, the trajectory will not be steep and, consequently, the velocity will not be zero at the apex. The actual glide will begin only in the highest air strata, *i.e.*, at an altitude of about 100 km.

Calculation shows that the time required to fly in such an aircraft from Europe to America will be from 30 minutes to 2 hours (depending on the acceleration adopted). An exact study of the possibilities of such a flight and of the difficulties to be surmounted (supersonic velocity) is reserved for a later publication.

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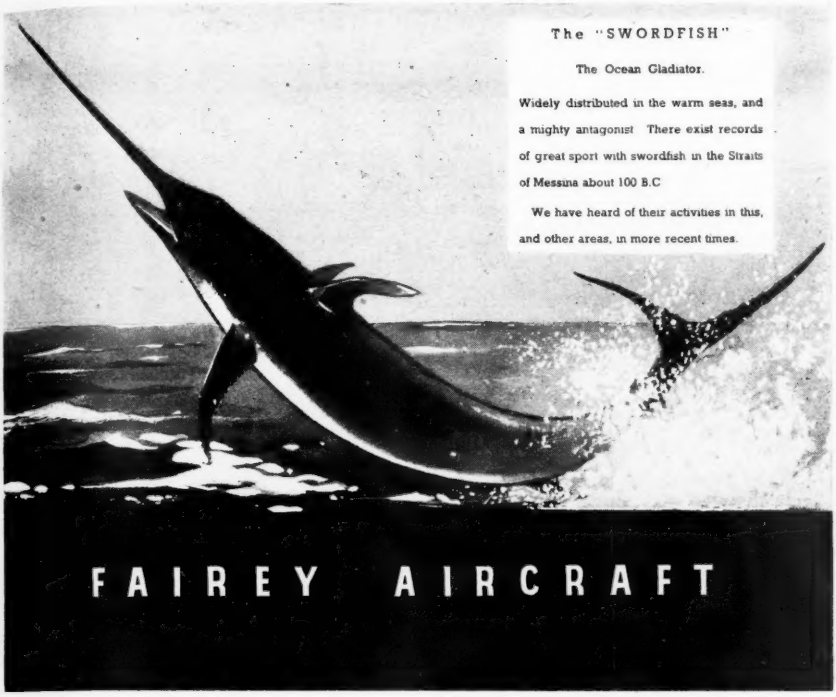
The "SWORDFISH"
The Ocean Gladiator.
Widely distributed in the warm seas, and a mighty antagonist. There exist records of great sport with swordfish in the Straits of Messina about 100 B.C
We have heard of their activities in this, and other areas, in more recent times.

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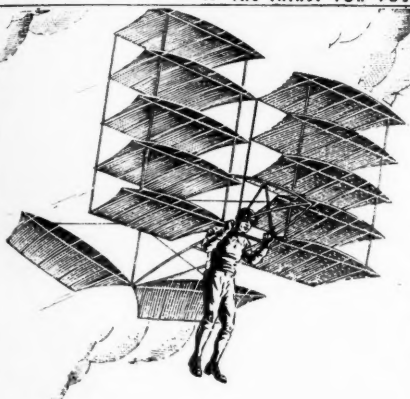

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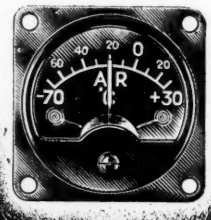

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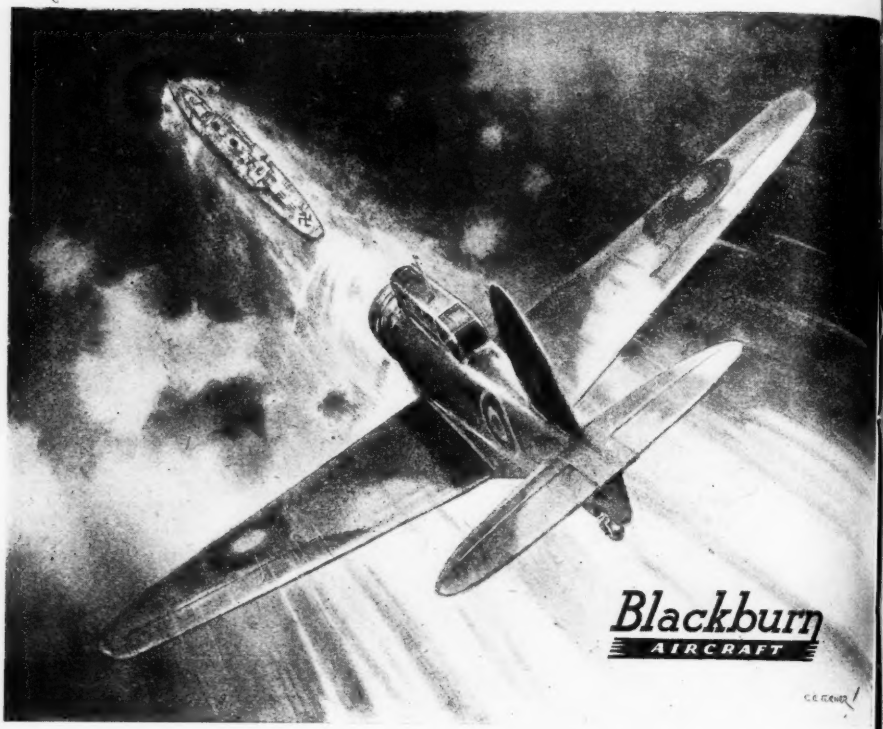

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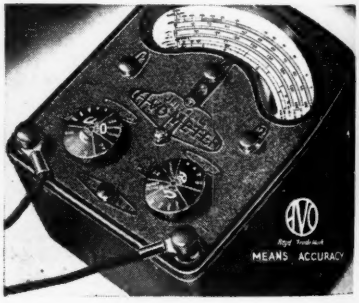

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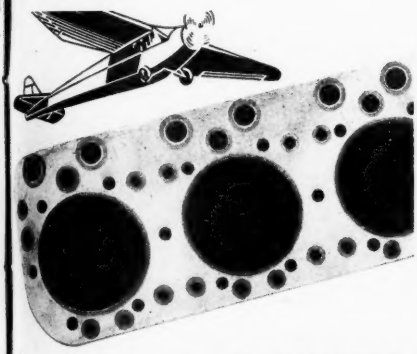

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Abstracts

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DECEMBER 1942 to OCTOBER 1943

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ABSTRACTS FROM THE SCIENTIFIC AND TECHNICAL PRESS.

Issued by the

Directorates of Scientific Research and Technical Development, Air Ministry.

(Prepared by R.T.P.3.)

No. 107. DECEMBER, 1942.

Notices and abstracts from the Scientific and Technical Press are prepared primarily for the information of Scientific and Technical Staffs. Particular attention is paid to the work carried out in foreign countries, on the assumption that the more accessible British work (for example that published by the Aeronautical Research Committee) is already known to these Staffs.

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NOTE.—As far as possible, the country of origin quoted in the items refers to the original source.

The Elliptic Wing Examined on the Basis of the Potential Theory. (K. Krienes, Z.A.M.M., Vol. 20, No. 2, April, 1940, pp. 65-88.) (107/1 Germany.)

The present paper is an extension of the theory of the lifting surface based on a linearised form of the acceleration potential as explained in an earlier paper by Prandtl (Z.A.M.M. Vol. 16, 1936, p. 300). It is assumed that the discontinuity of the potential function corresponding to the jump in pressure at the surface is treated on the basic ellipse and that the stream lines along which the convective integration of the acceleration is carried out are straight lines parallel to the incident flow.

In the case of an elliptic boundary, solutions of the Leplace differential equation can be obtained in the form of products of Lamé functions. These are examined by the author in detail and general expressions are obtained for the lift, moment and downwash for an elliptic surface of given curvature. For numerical calculations, the resulting infinite, series must be terminated after a few terms, depending on the accuracy required. This has only a negligible effect on the accuracy of the lift and moment values, but prevents any general statement on the induced resistance, since the evaluation of the letter necessitates the retention of all the coefficients of the infinite number of potential functions.

If shortened series are employed, the calculated lift distribution does not disappear at the wing tips and the correct distribution has to be estimated graphically.

In the first part of the paper, the investigation is restricted to symmetrical flow along either the major or minor axis of the ellipse. In the second part, oblique

flow (*i.e.* side slip) is considered. In each case numerical examples for a flat surface are worked out.

It is interesting to note that the values obtained for the rolling moment under side slip are in good agreement with the experimental value of Hoerner (R.T.P. transl. No. T.M.906) obtained on wings of various plane form. From this it appears that, the rolling moment under these conditions depends mainly on the angle of side slip and the aspect ratio, but that the chord distribution has but a negligible effect.

The case of a circular wing has been treated previously by Kinner, Ing. Arch., Vol. 8, 1937, p. 47. In the case of equality of axes, the elliptical problem reduces to the circular case and the author's expressions for the potential and downwash functions assume the same forms as those employed by Kinner.

Two Dimensional Potential Flow Past an Arbitrary Thick Wing Profile. (F. Keune, Year Book of German Aeronautical Research, 1938, Vol. 1, pp. 36.) (R.T.P. Translation No. T.M. 1,023.) (107/2 Germany.)

The two-dimensioned flow about a very thin profile has been solved satisfactorily by assuring a suitable vortex distribution along the medium line. [Birnbaum and Glauert.] The corresponding case of a thick profile could be attacked by the method of conformal representation. In general, however, the labour involved would be excessive and this method is therefore restricted to certain special shapes (Joukowsky and Kármán-Trefftz classes of profiles). Even then, however, the solution is strictly two-dimensional and cannot be extended to finite aspect ratio, For this reason the author has developed an extension of the Birnbaum method, in which the profile is replaced by a distribution of singularities along the medium line. In the case of a very thin profile, these singularities consist of vortices only. In the case of finite thickness, however, a source distribution is required as well in order to account for the displacement flow. The author shows how the distribution functions for the vortex and source singularities can be obtained for the generalised Kármán-Trefftz profile by including the flow inside the circle undergoing conformal transformation. It appears that only five distinct distribution functions are necessary to obtain a closed streamline conforming to this generalised profile. For each of these functions, the author gives the corresponding induced velocity field so that the resultant effect of the continuation can be easily estimated.

It appears that the effect of profile thickness on the velocity distribution is appreciable over a distance of the order of one chord length from the surface.

It is generally a simple matter to approximate any given profile by a corresponding K.T. shape and the author also gives a method for estimating the error involved in any given case. The generalised problem of a thick section may then be considered as solved. The converse problem of determining a profile contour satisfying a given singularity distribution is also discussed.

Application of the Hodograph Method to the Flow of a Compressible Fluid Past a Circular Cylinder. (K. Tamada, Proc. of the Physico-Mathematical Society of Japan, Vol. 22, No. 3, March, 1940, pp. 208-219.) (107/3 Japan.)

The two-dimensional subsonic flow of a compressible fluid past a nearly elliptic cylinder at zero angle of attack has already been solved by Tsien using the Hodograph method (J. Aeron. Sci., Vol. 6, 1939, pp. 399-407). The case of a circular cylinder has also been treated by the method of successive approximations. the well known solution for the incompressible fluid being used as a starting point. In the present paper, the Hodograph method is also applied to this problem, on the assumption that the fluid obeys a law of the form

$$p_o - p = c_o^2 \rho_o^2 (v - v_o)$$

instead of the true adiabatic pv^8=constant. (c_0=velocity of sound under conditions p_0, v_0.)

Substituting this equation in the generalised Bernoulli equation, both the velocity potential ϕ and the stream function ψ can be expressed in terms of two new independent variables, q and β

where q=velocity=$\sqrt{(u^2+v^2)}$.
β=inclination of q with x axis.

This is the basis of the Hodograph method as already employed in the earlier paper of Tsien mentioned above and by its means it is possible to transform the incompressible field of flow round a circular cylinder of radius a into the compressible flow round a slightly smaller cylinder which is now no longer truly circular. The deformation depends on the Mach Number of the undisturbed flow and for M=.4, the deformed cylinder approximates closely to a circle of radius .942 a.

For this Mach number, the author has calculated the velocity distribution an compared it with that obtained by the second approximation of the iteration method as well as with the experimental distribution obtained by Taylor using the electric tank. The comparison is satisfactory.

It should specially be noted that the critical value of the Mach Number (local speed of sound first attained in the field of flow) is given very accurately by the Hodograph method (for a circular cylinder M_c=.4).

New Horton High Altitude Glider of the Flying Wing Type with Parabolic Wings. (G. Horton, Flugsport, Vol. 34, No. 23, 11/11/42, pp. 341-345.) (107/4 Germany.)

High altitude gliders intended to make use of uprising thermal currents must be very manœuvrable and capable of very tight turns so as to make full use of meteorological conditions. Now a turn is liable to produce tip stalling and thus a loss of control of the glider and the danger of this is obviously the greater, the larger the span. A small span on the other hand will increase the surface loading and thus increase the radius of turn for the same altitude of the machine. Evidently the best span is a matter of compromise and according to the author, a span of 12 in. represents the optimum. By keeping the aspect ratio very low, the rate of descent will not be appreciably affected, although the induced drag under those conditions will necessarily be high, unless a very favourable lift distribution exists along the wing. According to the author, such a distribution exists along a crescent shaped wing with parabolic leading and trailing edges and this shape has accordingly been adopted in the new Horton high altitude "flying wing" glider.

The machine has a span of 12 m., wing area 33 m², aspect ratio 4.3 and an empty weight of only 90 Kg. This corresponds to a surface loading of 51 Kg/m², assuming a weight of pilot of 80 Kg.

Radius of turn at lift coefficient C_a=1 and 30° bank=9.6 m. Gliding ratio 19. Same details of the method of construction are given.

The central section (2.4 m. width) incorporates a tubular steel frame. The outer wings are built entirely of wood and the whole surface is covered in plywood, varying in thickness from .6 to 1.0 mm.

The controls resemble that of a previous flying wing design (Horton III) with the exception that the external flaps can be split by pedal control for neutralising the yawing moment.

Drag Reduction at High Speed by Inducing Supersonic Vibrations of the Surface. (*Pat. Series* 41, *No.* 726,324.) (Messerschmitt, Flugsport, Vol. 34, No. 23, 11/11/42, pp. 165-166.) (107/5 Germany.)

The object of the invention is to prevent steady flow conditions at the surface since, according to the inventor, such flow conditions are accompanied by greater

friction than if the flow is unsteady. At the same time, surface roughness is much less important as regards drag if the flow is unsteady. In order to produce unsteady flow at the surface, the inventor proposes to subject the latter to vibrations of a very high frequency (supersonic) either by interposing struts of magnetic strictive material subjected to a high frequency electromagnetic field or using a piezo electric oscillator.

It is stated that the oscillations need not be induced all over the surface but may be restricted to such portions which, on account of their shape, roughness or high relative wind normally experiences a large drag increase.

Locking Device for Aircraft Control Surfaces. (*Pat. Series* 41, *No.* 726,207.) (Fieseler, Flugsport, Vol. 34, No. 23, 11/11/42, p. 167.) (107/6 Germany.)

Locking device for aircraft control surfaces consisting of a locking pin inserted in a corresponding hole of the surface, characterised by the fact that the pin is attached to the end of cylindrical corrugated metal box contained inside a cylindrical fixed guide. On subjecting the box to hydraulic pressure, the pin is projected into the corresponding hole of the control surface causing a positive lock. On relieving the pressure, the elasticity of the box withdraws the pin automatically inside the fixed guide, which is provided for this purpose with a rubber gland.

Installation of Fixed Guns Inside the Wing Root Attachment. (*Pat. Series* 41, *No.* 726,326.) (Heinkel, Flugsport, Vol. 34, No. 23, 11/11/42, p. 186.) (107/7 Germany.)

Gun installations inside wing root attachment characterised by the fact that the fixed axis of the gun is in the plan of separation between outer and central wing.

The weapon may pass through openings in the wing fittings or be rigidly attached to such fittings.

Spoiler Flaps (Combined with Air Injector). (*Pat. No.* 725,194.) (A.V.A. Goettingen, Flugsport, Vol. 34, No. 22, 28/10/42, Patent Series No. 40, p. 162.) (107/8 Germany.)

The spoiler is hinged at its lower end and in the retracted (or folded) position closely conforms to the wing contour. Holes are provided near the hinged end of the flap which register with an interval cavity in the wing through which warm air can be ejected, thus preventing icing up.

When the spoiler is in the operative position (almost perpendicular to the relative wind) the air ejected from the wing enters the dead angle formed between flap and wing and this together with the ventilation through the holes mentioned above increases the spoiler effect of the flap.

Application of Rotors to Air or Marine Craft. (*Pat. No.* 724,796.) (Holst, Flugsport, Vol. 34, No. 22, 28/10/42, Patent Series No. 40, p. 162.) (107/9 Germany.)

The so-called " Magnus " effect of a rotating cylinder is well known. The inventor claims that equally high lateral forces can be obtained by rotating an aerofoil about its longitudinal axis. The subject of the patent is to provide the main wing of an aircraft with tip sections which can rotate about a longitudinal axis and thus produce large aerodynamic forces (the outer end of the tip being provided with an end plate).

The tip is rotated either by an independent power supply or auto-rotation can be produced by proper choice of axis of rotation. Apart from this auto-rotation a further advantage of using aerofoil instead of circular sections for the rotor elements lies in the fact that the stationary rotor will develop some lift in the latter case. A stationary cylinder on the other hand exerts drag only.

Problem of Two-Stroke Engine Design with Special Reference to Continued Reciprocating and Rotation of the Piston. (R. Mertz, A.T.Z., Vol. 45, No. 6, 25/3/42, pp. 149-156.) (107/11 Germany.)

As is well known the fundamental problem of high performance two-stroke design is to provide adequate port area and suitable unsymmetrical valve timing for scavenging and supercharging. The opposed piston design has so far held the field, but is rather cumbersome. Other solutions necessitate the provision of sleeve or rotary valves and attempts have also been made to modify the normal poppet valve gear of the four-stroke for this purpose.

All these designs are rather complicated and for this reason the author suggests an alternative solution in which the unsymmetrical valve diagram is obtained without the provision of any additional governing device by imparting an oscillatory rotary motion to the piston. This can be achieved theoretically in a simple manner by departing from the orthodox crankshaft construction and adopting a crankpin which, whilst still in the same plane as the crankshaft axis, is now inclined to the latter. The crank throw thus resembles a right angled triangle rotating about its base and if the connecting rod is linked to a sleeve on the throw, rotation of the shaft is accompanied by a rotary motion of the piston which is superimposed on its reciprocation. In the case of an infinitely long connecting rod, the maximum angle of rotation of the piston on either side of the mean position is equal to the angle of slope of the crankpin and recurs when the crank throw is at right angles to the dead centre position.

The author obtains expressions for the angular displacement, velocity and acceleration of the piston as a function of crankshaft displacement and angle of slope of pin and concludes that the corresponding inertia loads can be kept small.

The new method of control is then applied to a standard three-port crank-scavenging engine in which the top of the piston controls the exhaust and scavenging ports whilst the inlet to the crankcase is controlled by the piston skirt. By cutting the piston crown at various angles it is possible to obtain a variety of unsymmetrical timings for a given angle of slope of the pin. This is shown in the following table:—

Crank pin slope, 30°.
Connecting rod crank ratio, $\frac{1}{4}$ or 1 : 4.
Stroke bore ratio, 1.0.

Piston crown slope.	$Q_1 = 20°$ $Q_2 = -20°$	$Q_1 = 30°$ $Q_2 = -30°$	$Q_1 = 30°$ $Q_2 = -20°$	$Q_1 = 20°$ $Q_2 = -30°$
Exhaust opens	65° b. B.D.C.	65° b. B.D.C.	65° b. B.D.C.	65° b. B.D.C.
Exhaust closes	43° a. ,,	29° a. ,,	29° a. ,,	43° a. ,,
Scavenge opens	43° b. ,,	43° b. ,,	43° b. ,,	43° b. ,,
Scavenge closes	65° a. ,,	79° a. ,,	65° a. ,,	79° a. ,,

It will be noted that four different timings are obtainable with only two different piston slopes. The available port areas compare favourably with those obtained in an opposed piston design.

Note.—The article gives no details concerning the method of attachment of connecting rod to a sloping crank pin.

Twin-Engined High Speed Experimental Aircraft, Arsenal V.G. 50. (Inter. Avia., No. 841-842, 31/10/42, p. 29.) (107/12 France.)

The engines (Hispano 12Y) are mounted exactly in line, the extension shaft of the rear engine lying on a support normally provided for the engine cannon mounted on the front engine. This shaft is connected to the rear engine via a special elastic coupling which incorporates an intermediate shaft and is designed to deal with the axial deflections unavoidably associated with this type of engine installation. Preliminary flight tests are stated to be primarily concerned with the testing of this novel form of transmission.

Four-Bank Six-Cylinder Radial Engine with Crank Throws in One Plane. (*Pat. Series* 41, *No.* 711,137.) (Junkers, Flugsport, Vol. 34, No. 23, 11/11/42, p. 346.) (107/13 Germany.)

The proposed radial design consists of four banks of six cylinders each placed immediately behind each other, each bank having the usual master rod assembly working on a single throw of the four-throw crankshaft.

The crankshaft resembles an ordinary four cylinder layout, with all the cranks in one plane. Starting at the front, with the first crank pointing, for example, downwards, crank two and three would point up and crank four down. The first and second bank form a group with opposed cylinders firing simultaneously. After two consecutive explosions of this type, the cylinders in banks three and four forming group two take over in a similar manner, ignition thus alternating between group one and group two.

The simultaneous ignition of opposed cylinders reduces the load on the crankshaft bearings and this facilitates a very compact construction.

Production Testing Facilities of Allison Division of General Motors. (H. J. Buttner, S.A.E.J., Vol. 50, No. 10, Oct., 1942.) (107/14 U.S.A.)

Design features discussed include general building arrangement and construction, engine stands and mounts, operational equipment, temperature regulating equipment, plumbing, filters, weighing equipment, instrumentation and sound treatment.

The mount problem is discussed from the standpoint of design, vibration, and endurance operation. Methods for straightening air in U-shaped test cells are touched upon.

Layout of heat exchangers emphasizes rapid warm-up and economical water usage. Temperature control of glycol and oil is obtained by by-passing coolers. The plumbing is designed for ease and disassembly and cleaning. Full-flow filters have proved worth while in the oil system. Fuel measurement is obtained both by weight and by rotameters.

The operator's control layout is illustrated and discussed.

Sound-absorption problems are noted, and sound-absorption tests are illustrated.

Oxidation Characteristics of Lubricating Oils (Stability and Chemical Composition). (G. H. von Fuchs and H. Diamond, Ind. and Eng. Chem., Vol. 34, No. 8, Aug., 1942, pp. 927-937.) (107/15 U.S.A.)

For purposes of fundamental investigation, the oxygen-absorption measurement was chosen since it can be performed with precision and is probably the best single criterion of total deterioration. Measurements of this type are well adapted to kinetic interpretation, as the primary process in the oxidation of an oil is one involving oxygen regardless of the products which are eventually formed. On the other hand, sludge formation, for example, though a major problem in lubrication, does not indicate other phenomena which occur. Thus, a white oil may be oxidized until it contains large quantities of acids but without the formation of any insoluble products. Similary, changes in viscosity may be due to many causes. Furthermore, as discussed below, oxygen-absorption measurements properly applied and interpreted can furnish a means for evaluating stability which is more suitable than the customary routine tests from the viewpoint of actual service performance.

Analysis of rate curves obtained by measurement of oxygen absorption using a special magnetically operated pump has elucidated the effect of basic composition, methods of processing, and addition agents on the stability of oils. Oxidation characteristics are strongly influenced by interaction phenomena between different types of components. Saturated hydrocarbons in an oil have a tendency to rapid auto-catalytic oxidation, whereas aromatic compounds act as

antioxidants by a mechanism of autoretardation. The balance between these opposing effects is strongly dependent on the reaction temperature. Under given conditions of temperature and metal catalysis, maximum stability is observed at an intermediate (optimum) aromaticity. The phenomenon of autoretardation is differentiated from conventional inhibitor action.

Reactions involved in the formation of saponifiable material (free, combined, and potential acids) may account for most of the oxygen absorbed by an oil. Results of the laboratory oxidation experiments have shown good correlation with oil deterioration and lacquer deposition in small-scale engine tests.

It is believed that laboratory oxidation experiments can be correlated with general rate of deterioration of oil in an engine, but agreement with the appearance of an engine cannot always be expected. For example, an unstable white oil may form abundant quantities of soluble oxidation products and yet deposit no sludge or lacquer; on the other hand, a heavy asphaltic aromatic could conceivably act as a powerful retardant but yet be so slightly soluble that its oxidation products tend to be precipitated readily. The fact that the S.A.E. No. 20 motor oil containing bright stock gave a cleaner engine than the corresponding neutral (Figure 10), in spite of such possible effects, strongly indicates that the intrinsic oxidation stability of oils is one of the important factors which determine engine performance. It is thus clear that oxygen-absorption measurements can yield information of practical as well as theoretical significance if the data are interpreted with care. Still greater confidence in work of this type will doubtless be developed as further laboratory and service data are accumulated.

The Testing of Heavy Duty Oils (with Discussion). (H. C. Mougey and J. A. Moller, S.A.E.J., Vol. 50, No. 10, Oct., 1942, pp. 417-438.) (107/16 U.S.A.)

Principal conclusions:—

1. By means of carefully controlled operating conditions, production multi-cylinder engines can be used, in conjunction with a series of standard test oils, to give a test pattern for these oils which are reproducible themselves, and which will coincide with the results obtained on these oils in service in so far as corrosion and oxidation resistance characteristics are concerned.

2. The description and specification of heavy-duty motor oils of known and unknown performance for oxidation and corrosion characteristics are, for the moment at least, most easily achieved by describing this oil in terms of a reference oil test pattern;

3. The 36-Hr. Oxidation Test Procedure (see Table 5, Appendix) is a satisfactory method for the evaluation of oils for heavy-duty service with respect to their oxidation and corrosion characteristics only; and an additional test procedure, such as the Caterpillar Test series, is required to measure certain other properties, such as resistance to ring sticking, resistance to port clogging, resistance to piston scuffing and cylinder scratching, and so on;

4. Therefore, by means of the 36-Hr. Test Procedure and the Caterpillar Test Series, a heavy-duty motor oil may be evaluated for most of the important characteristics; however, valve sticking, winter sludge, and other undesirable characteristics are not necessarily evaluated by these tests and, if these factors become important, a separate study will have to be made for their evaluation;

5. From the point of view of the engine manufacturer, not only can unknown oils be evaluated by means of the known reference test oil pattern, but so can engines of present and future designs; the severity of the conditions which the engine imposes on the oil may also be evaluated for the declared drain time;

6. To make these test procedures practical, an Engine Test Committee must continuously, and continually, follow the progress in both engine and oil design so that, once such a test procedure and description have been decided upon and accepted, changes such as must necessarily be demanded by progress shall be made only with the consent and approval of all those affected by such changes.

The Role of Surface Chemistry and Profile in Boundary Lubrication. (J. T. Burwell, S.A.E.J., Vol. 50, No. 10, Oct., 1942, pp. 450-457.) (107/17 U.S.A.)

Both the geometry and the chemistry of bearing surfaces have a marked effect on performance under conditions of boundary lubrication and the salient features of these factors are discussed in this paper.

It is pointed out that the average surface slope should be specified in addition to the root-mean-square roughness in grading surfaces for lubrication performance. The presence of loose material or " fuzz " on all commercially finished surfaces is noted.

Data are presented to show that one function of addition agents in oils is to mitigate the bad effect of poor surface finish. The affinity of lubricants for metal surfaces is discussed, and methods for experimentally measuring this property are outlined, together with results.

It is shown that a high affinity of " wettability " is a necessary but not a sufficient condition for a good boundary lubricant. Its molecules should also have the proper structure and the lubricant should contain a surface-active addition agent in adequate concentrations.

1941 *C.F.R. Road Detonation Tests.* (J. M. Campbell and others, S.A.E.J., Vol. 50, No. 10, Oct., 1942, pp. 458-464.) (107/18 U.S.A.)

The co-operative road tests carried out during 1941 have added considerable information and experience to that already existing on the subject of road detonation testing.

Extensive data were obtained on the fuel requirements of the 1940 and 1941 models of the three most popular cars. Corresponding data were obtained on the knocking characteristics of current gasolines representing the bulk of the sales volume in various parts of the United States.

On account of large variations in octane-number requirement among different cars of the same make—due to differences in ignition timing, combustion-chamber deposit, and other causes—and on account of variations in commercial gasolines, it has been necessary to use statistical methods of analysis in the appraisal of fuel and engine relationships.

These methods of analysis have been applied in a number of ways, and have proved very useful. For this reason, the continuance of co-operative activity in compiling current statistical information annually on fuels and car requirements is recommended.

Determination of Graphite in Pig and Cast Iron (Digest). (E. Drapschlag, Stahl und Eisen, Vol. 62, No. 15, 9/4/42, pp. 315-316.) (107/19 Germany.)

As is well known, graphite determinations are subject to a certain amount of error partly due to the method of sampling. The iron to be analysed is often of slightly variable composition and the answer may depend on the position of the drilling for the powdered specimen. The subsequent gravimetric analysis for graphite depends on the insolubility of the latter in nitric acid. Now graphite may be produced in the original iron by the decomposition of iron carbide during the solidification stage and since this is quite a lengthy process the carbon deposited may range over a series of forms intermediate between amorphous carbon and true graphite. We cannot therefore expect a sharp differentiation in solubility and the answer will depend to some extent on the concentration of the nitric acid employed. The author shows that the graphite will indeed be partially oxidised if the acid is above a certain limiting concentration. It appears that the effect depends on the total surface of the graphite particles and this can be used as a method of grading the iron if a metallographic estimate of the total number of carbon particles is available.

The Absolute and Practical Creep Strength and Their Relation to Fatigue Strength. (V. Dehlinger, Z.f. Metallk., Vol. 32, No. 6, June, 1940, pp. 199-200.) (107/20 Germany.)

The absolute creep strength is defined as the limiting load under which a material, after an initial extension, comes to rest, *i.e.*, no further extension takes place with time.

Similarly the absolute fatigue strength is the variable stress which can be supported indefinitely, *i.e.* for an infinite number of cycles.

Both these factors cannot be determined directly with any accuracy and are replaced in engineering by their " practical " equivalents. The practical creep strength is defined as the limiting load which during a 10 hour period between the 25th and 35th hour of load application does not produce an average extension exceeding 10^{-3} per cent. per hour. Similarly the fatigue strength is the limiting stress corresponding to a life of 10^6 or 10^7 load cycles.

Now whilst at relatively low temperatures, the practical fatigue strength as defined above approximates to the time value (asymptote to the Wohler curve) it appears that the practical creep strength as obtained by short time tests is quite useless in determining the ultimate load capacity of a material. The author has investigated this problem theoretically and concludes that in those cases where a true creep limit exists (recrystallisation avoided) the value will coincide with the practical fatigue strength for repeated loads (no stress reversal) as given by the horizontal portion of the fatigue temperature characteristic of the material. If such a horizontal portion (covering the lower temperature range) does not exist, the material has a zero value for the true creep limit.

The author replots some experimental values on this basis and shows that in general the practical creep strength will intersect the fatigue strength curve, both being plotted on a temperature basis. At low temperatures, the practical creep strength is considerably higher than the fatigue strength; the reverse holding after the cross-over. In conclusion, the author recommends that in future the practical creep strength be dropped as a criterion of the meterial and replaced by the temperature characteristics of the fatigue curve (repeated loads, 10^6 cycles).

Replacement of Rubber by Thermo-Plastic for Electric Cable Insulation (Polyvinychloride). (H. Beck, Z.V.D.I., Vol. 86, No. 41-42, 17/10/42, pp. 629-632.) (107/21 Germany.)

Up to quite recently, rubber was used almost exclusively for electric cable insulation, the unvulcanised rubber mixture being applied either in the form of strips subsequently sealed by pressure (giving rise to longitudinal seams) or the mixture was squirted on to the wire by means of a nozzle through which the wire passed continuously. In each case the rubber has to be vulcanised subsequently.

With the advent of thermo plastic (igelite) attempts were soon made to utilise such substance for covering wire by the nozzle process. Whilst, however, the rubber mixture can be extruded at room temperature, the plastic requires a temperature of 160-180° C. to ensure satisfactory flow conditions.

The author describes early attempts to apply the necessary heat by means of steam or hot oil leading up to zoned electrical heating.

Although great advances have been achieved, a really satisfactory design suitable for mass production does not yet seem to have been evolved, although covering rates of the order of 20 m/min. for a wire of 2.5 mm² cross-section have been achieved. The chief difficulty appears to be the correct centering of the wire in the die.

The author's proposals for overcoming this trouble are described in detail.

It is stated that some of the improvements in nozzle design brought about mainly in an attempt to utilise thermoplastics have been adopted in the standard rubber covering process, leading to a great increase in the rate of work.

Speeding Up Production by Rapid Supply and Withdrawal of Goods in the Machine Shop. (Z.V.D.I., Vol. 86, No. 41-42, 17/10/42, p. 632.) (107/22 Germany.)

It is most uneconomical to use the workshop travelling crane for supplying machine tools with light or medium weight articles. For this purpose special jib cranes should always be installed, capable of feeding several machine tools. These cranes are operated electrically and provided with high and low speed drives. Special machine tools handling bulky articles are best fitted with individual conveyers. In this connection attention is called to the possibility of mounting the tool in a pit so that the goods can be installed with greater ease. A lathe for machining wheel assemblies (railway trucks) embodying this feature is illustrated.

The Strength of Gear Wheels Made of Laminated Plastics. (Z.V.D.I., Vol. 86, No. 41-42, 17/10/42, p. 638.) (Digest.) (107/23 Germany.)

The report covers investigations on the strength of individual teeth of gear wheels manufactured either from a plastic with fabric filler (coarse or fine) or from plastic bonded and compressed wood. All the wheels examined had a pitch circle of 159 mm., thickness 50 mm., and were provided with a central hole of 75 mm. The tooth modulus varied from 3 to 7.

The following average results were obtained:—

	Bending Strength.	Bending Fatigue (10^7 reversals).	Impact Strength.
Plastic with fabric filler (coarse)	1360 Kg./cm.^{2}	400 Kg./cm.^{2}	17-31 Kg. cm./cm.^{2}
Ditto (fine)	1588 ,,	—	—
Bonded wood	1785 ,,	800 ,,	55-160 ,,

It appears that the bending strength is independent of the tooth modulus. The value given for the bending fatigue apply for tooth modulus of 5 and 7. A smaller modulus (3°) gives apparently lower values.

In the case of impact strength, there is a marked effect of the tooth modulus, the values increasing with the latter. The figures given for the bonded wood are for a tooth modulus of 7 and the large range of experimental value will be noted.

A Practical Method of Allowance for Shear Lag. (J. S. Coutinho, J. Aeron. Sci., Vol. 9, No. 12, Oct., 1942, pp. 471-477.) (107/24 U.S.A.)

The calculation of stresses in a semi-monocoque cantilever wing is discussed from an engineering-office point of view.

The influence of various factors on the stress distribution in thin-walled structures is considered, especially the effects of shear lag for which a simple empirical method of allowance is suggested. The use of the method is illustrated in the example of a box-beam wing, and the results of the calculations are checked by stress measurements on a full-size test specimen.

The curves of stress distribution calculated according to the suggested method follow the shape of the measured stress distribution curves considerably better than the curves calculated by the standard method. By a better choice of the efficiency curves, the exact shape of the measured curve could be reproduced.

It is expected that a man of good judgment will be able, with some experience, to estimate effective areas and efficiency curves with reasonable accuracy, so that this method can be of considerable value in the practical design of efficient metal aircraft structures.

It is, however, highly desirable that reliable methods of estimating effective areas and efficiency curves be developed.

Weight per Foot Run of Circular and Hexagon Wires. (Hutte, Vol. 1, p. 815.) (107/25 Germany.)

If D = diameter of circular wire (in.).

d = distance between opposite flat faces of the hexagon (in.).

Volume of wire per foot run = 9.426 D^2 cubic inches (circular) or 10.392 d^2 cubic inches (hexagon).

The following table gives average density values γ for various materials :—

Material.	γ lb./cubic inches.
Dural	.101
Copper	.321
Steel	.283
Brass	.307

In case of Dural, weight per foot run is thus

.952 D^2 (circular) or

1.05 d^2 (hexagon).

Thus a one inch wire of this material weighs approximately 1 lb. per foot run = 100 feet of .1 in. wire. In the case of copper, the weight is approximately three times as great.

Rapid Identification of Non-Ferrous Scrap. (Metal Industry, Vol. 61, No. 19, 6/11/42, pp. 294-295.) (107/26 Great Britain.)

Material.	Surface Appearance.	Magnet Test.	Lathe Chip Test.	Blowpipe Test.
Nickel	Dark grey; smooth; sometimes green (oxide)	Magnetic	Cuts easily: smooth edges; can be continuous	Melts slower than steel; less slag than Monel; quiet puddle
Monel	Dark grey; smooth	Slightly magnetic at room temperature	Cuts easily: smooth edges; can be continuous	Melts slower than steel; considerable quiet slag; quiet puddle
"Nickel Silver"	Grey to yellow or yellow to green	Non-magnetic	Smooth, long, often continuous chips	Moderate melting speed; fumes
Brass	Yellow to green or brown	Non-magnetic	Smooth, long chips; more brittle than copper	Moderate melting speed; gives off fumes; puddle like water
Tin Bronze	Red to brown	Non-magnetic	Smooth, long chips; more brittle than copper	Fast melting, some fumes; puddle like water
Aluminium Bronze	Yellow-brown	Non-magnetic		
Copper	Smooth; red-brown to green (oxides)	Non-magnetic	Smooth, long easily cut chips	Slow melting; very little slag puddle bubbles
Aluminium	Light grey to white; dull or brilliant	Non-magnetic	Smooth chips; saw edges where cut; chips can be continuous	Very fast melting; quiet black scum forms, quiet puddle

Material.	Surface Appearance.	Magnet Test.	Lathe Chip Test.	Blowpipe Test.
Magnesium Alloy	White; surface coating may be yellow-brown	Non-magnetic	Short, easily cut chips	
Lead	Smooth, velvety; white to grey	Non-magnetic	Cut by knife; any shape chip	Melts very fast; quiet slag, dull grey coating; quiet puddle
Lead-Silver Solder	Smooth; dark grey; sometimes discoloured	Non-magnetic	Harder than lead; any shape chip	Slower melting than Pb or Pb-Sn
Lead-Tin Solder	Smooth; white to grey; may be frosty	Non-magnetic	Harder than lead; any shape chip	Faster melting than Pb-Ag; about same as lead

CHEMICAL OR SPOT TESTS.

Material.	Nitric Acid.	"Iron Nail" Test.	Ammonia Test.	Others.
Nickel	Reacts slowly; pale green solution	Negative	Blue	No. 4—Intense red colour
Monel Metal	Reacts; greenish-blue solution	Copper plates out	Dark blue	No. 4—Intense red colour
"Nickel Silver"	Reacts; bluish-green solution	Copper plates out	Dark blue	No. 4—Red colour varies in intensity with nickel content
Brass	Reacts vigorously; green solution	Copper plates out	Dark blue	No. 4—No red colour in nickel-free alloys
Tin Bronze	Reacts vigorously; blue-green solution	Copper plates out	Dark blue	——
Aluminium Bronze	Reacts vigorously; blue-green solution	Copper plates out	White ppt.; blue soln.	——
Copper	Reacts vigorously; blue-green solution	Copper plates out	Dark blue	——
Aluminium	Soluble	——	White ppt.	——
Magnesium Alloy	Soluble	——	Colourless	——
Lead	Soluble	——	Colourless	No. 5—No ppt.
Lead-Silver Solder	Soluble	——	Colourless	No. 5—No precipitate in absence of tin
Lead-Tin Solder	Soluble	——	Colourless	No. 5—Black deposit with white ppt.

Spot Test Procedures.

Test No. 1—Nitric Acid Test.

Place 1 or 2 drops of concentrated nitric acid on the clean metal surface. Observe any reaction for 1-2 minutes. Then dilute with 3-4 drops of water, and observe reaction. If solution turns green or blue use it for the " iron-nail " test.

Test No. 2—Iron Nail Test.

Rub a clean iron nail in the coloured acid solution, in contact with the specimen. If the alloy contains copper, copper will be deposited on the nail or the metal surface.

Test No. 3—Ammonia Test.

Dissolve a bit of the metal in nitric acid, or attack the surface with a few drops of acid. Dilute somewhat, carefully add ammonium hydroxide to the solution until the latter is strongly alkaline. If copper or nickel is present, a pale blue precipitate will form, which on further ammonium hydroxide addition becomes a dark blue solution.

Test No. 4—Paper Test for Nickel. (Williams, Ind. and Eng. Chem., January, 1942.)

One drop of acid mixture (10 ml. H_2SO_4, 10 ml. HNO_3, 10 ml. H_3PO_4, 10 g. citric acid, 25 ml. water) is placed on the metal for 15-30 seconds, then absorbed in a paper test strip (filter paper dipped in a solution of 10 g. citric acid, 25 ml. H_2O, 10 ml. of 1 per cent. dimenthyglyoxime in isopropanol and dried). When KOH is dropped on the paper, a red colour will form if nickel is present. This test is free of colour interference from iron or other elements.

Test No. 5—Silver Nitrate Test for Tin.

Treat the clean metal surface with a few drops of 2½ per cent. silver nitrate solution. If tin is present, a black deposit with a white precipitate will form.

The Development of Light Alloy Gas Cylinders in Switzerland. (T. Wyss, Light Metals, Vol. 5, No. 58, Nov., 1942, pp. 448-456.) (107/27 Switzerland.)

The light alloy gas bottles at present in use in Switzerland are the outcome of 10 years' development work. Swiss law requires that such bottles satisfy stringent mechanical tests, details of which are given.

The body of the report deals with tests carried out on a number of bottles which had been in service over different periods. Details are given below:—

Material	Manufacture	Period in use
Lantal	German	1928-34
Anticorodal	Swiss	1934-38
Avional D	,,	1935-37
Avional DTI	,,	1938-40

Location of the test pieces on the bottles and details of the mechanical tests are given. In the case of Lantal, tensile tests met minimum requirements in all cases. Some of the other factors did not, however, always come up to specification. It is interesting to note that after eight years' storage this material showed no deterioration compared with the new state. Anticorodal proved less satisfactory and the same applied to the original form of Avional (1935). This material has, however, been greatly improved in the meantime (addition of Ti and better heat treatment), and is now considered the most satisfactory for pressure bottles.

The composition of the various alloys is given below:—

Name.	Si.	Cu.	Mn.	Mg.	Fe.	Ti.	Al.
Lantal	1.2-2.1	4.4-4.7	.55	—	.36	—	rest
Anticorodal	.9-1.1	—	.6-.8	.65-.75	.2-.4	—	rest
Avional D	.2-.35	3.6-3.8	.5	.55	.23-.3	—	rest
Avional DT1	.25	3.8	.5	.5	.27	.16	rest

Bottles can be manufactured either from small tubes by pressing (Erhard process), or by welding of neck and base or by deep drawing from slugs. The last process is now adopted for the Avional bottles, the finished product being anodised to prevent corrosion.

It appears likely that industrial light metal gas cylinders will be confined at present to the smaller sizes (1-3 litres). In all cases, however, where dead weight must be reduced to a minimum, such bottles open interesting possibilities (oxygen equipment for high altitude flying).

It is regretted that the report gives no details on the weights of such alloy bottle nor is their behaviour when subjected to machine gun fire discussed.

It is stated, however, that under certain conditions compressed oxygen escaping from small fissures in light alloy may cause the latter to burn. This danger can apparently be completely avoided if the light alloy has previously been anodised.

The Wear of Plastic Gear Wheels. (Z.V.D.I., Vol. 86, No. 41-42, 17/10/42, p. 638.) (Digest.) (107/28 Germany.)

The gear wheels had a pitch circle of 195 mm. and their wear was investigated when running in conjunction with cast iron wheels with grease as a lubricant. Two kinds of plastic with coarse and fine fabric filler respectively were investigated, as well as plastic bonded and compressed wood. Three different values of the tooth modulus were employed (3, 5 and 7), corresponding to 65, 39 and 28 teeth respectively. In the case of compressed wood, best results were obtained with a veneer thickness of 1mm. with grain direction at 45°. For this arrangement the wear was practically the same as that obtained with the plastic containing coarse fabric filler. It appears that an increase in bonding pressure of the wood above 200 atmosphere is not warranted. Generally speaking, wear is reduced as the tooth modulus decreases (number of teeth increasing). At very small circumferential speed, however, the reverse holds.

The load coefficient c depends on the tooth number and the circumferential velocity v on the pitch circle. The following values were obtained for a tooth modulus 5 (39 teeth) :—

v (m/sec.)	c (kg./cm.²)
3	35
11	15

Bonding of Plastic to Metal Sheet (Anchoring by Means of Burred Holes in the Latter) (Plastel). (N. A. de Bruyne, British Plastics, Vol. 14, No. 162, November, 1942, pp. 306-316 and 349.) (107/29 Great Britain.)

By bonding sheet metal to plastics, both the flexural stiffness and dimensional stability of the panel are increased. It is easily shown that if the bonding is perfect, much greater stiffness can be obtained than is possible for the same weight of steel alone or plastic alone. By choosing the optimum ratio between thickness of filler and thickness of cover plates, the composite structure will be 2½ times as stiff as a dural panel and 15 times as stiff as a steel panel of the same weight. Similarly the stiffness of plywood can be increased 10 per cent. by sheathing it with dural. Approximately perfect bonding can be obtained with certain kinds of cement. As an alternative, the metal sheet can be attached to the plastic direct, by providing the former with burred holes in which the plastic (thermosetting or thermoplastic) is anchored. The product obtained by this simple method is known as Plastel and although the adhesion is not perfect, the resultant structure is still about 20 per cent. stiffer than a dural panel of equal weight. Quite apart from increased flexural stiffness, the metal bonding ensures greater dimensional stability to the plastic under changes of humidity and temperature. As is well known, transparent panels of cellulose acetate are apt to crack round the bolt holes where they are secured. This can be completely cured by bonding the edges with metal. In the same way, the danger of starring

or splintering when drilling holes in acryl resin sheets can be avoided by " plastelising."

Another interesting application of metal bonded plastics is the construction of screening panels for wireless installation. By removing the surface metal by means of a simple trepanning tool, through connections can be made without the use of separate insulating bushes. The simple method of bonding is also applicable to the surface of airscrew blades made of resin bonded wood.

The Tee Bend Test to Compare the Welding Quality of Steels R.P. 1,444. (G. A. Ellinger and others, J. Res. Bur. of Stands., Vol. 28, No. 1, January, 1942.) (107/30 U.S.A.)

A bend test for comparing the welding quality of steels is described in this paper. Specimens of fillet-welded T-sections of a number of low-alloy high-tensile steels were bent in special testing jigs at room temperature and at temperatures as low as −20°F. Several criteria, such as maximum load, angle at maximum load, type and location of fractures, were used to compare the specimens. A special method of statistical analysis, which is described in detail in the paper, was used to evaluate the data and to compare and rate the welding quality of the steels.

No good correlation was found between any of the usual tensile properties or Vickers numbers of the steel and weldability; therefore they cannot be used for determining the welding quality.

Usually normalised plates had higher welding quality than the rolled plates of the same steels, due probably to relief to stresses set up during rolling and to a more homogeneous structure of the metal.

Most " dirty " steels had lower welding quality than clean steels.

Austenitic grain size and grain-coarsening temperatures apparently had little effect on welding quality.

Steels containing nickel and copper had the highest welding qualities of the steel tested, while those containing more than 0.70 per cent. of manganese had the lowest welding quality. Phosphorus greater than 0.10 per cent. also is believed to contribute to low welding quality in steels.

Plates welded at low temperature had lower angles of bend and more plate metal failures than welded at room temperature. The temperature of testing apparently had more effect on the angle of bend and plate metal failures than the temperature of the plates when welding was begun.

This bend test provides a reliable means for determining the welding quality of steels. A structural weld is tested without machining the surface, leaving the welds intact as deposited. The reproducibility of results of duplicate specimens is excellent. The angle of bending and the kind, extent, and location of the fractures are important criteria of the welding quality of steels and not a function of the shape of the specimen.

Tensile Elastic Properties of Nickel, Copper, Open-Hearth Iron and Typical Steels. (*R.P.* 1,459.) (D. J. McAdam and R. W. Mebs, J. Res. Bur. Stands., Vol. 28, No. 3, March, 1942, pp. 311-378.) (107/31 U.S.A.)

From stress-set curves are derived proof stresses for five values of permanent set. From corrected stress-strain curves are derived values of the modulus at zero stress and its stress coefficient. The diagrams show the influence of prior plastic extension on these indices.

The curves of variation of the proof stresses with plastic extension are affected by the rate of work-hardening, by variation of internal stresses of two kinds, and by the rest interval; the curves of variation of crystal orientation, internal stress, and lattice expansion, and by rest. The curves of variation of the stress coefficients of the modulus are affected by all these factors except possibly the reorientation factor.

Wear of Cutting Tools as Affected by Shape of Tool. (H. Ferchland, Der Betrieb, Vol. 28, No. 8, Aug., 1942, pp. 333-336.) (107/32 Germany.)

Unless the tool is presented symmetrically the finite force in the direction of cut will necessarily cause the fine edge to break off until a sufficient depth of material is reached so that the shearing and bending stresses in the tool can balance the cutting force. The subsequent wear of the tool is entirely due to friction and the author shows that, other things being equal, the time required to produce a given shortening of the tool tip is approximately proportional to the clearance angle and almost independent of the slope.

These conclusions are verified by experiments carried out on a laminated plastic plate 16 mm. thick cut by a circular saw of high speed tool steel at a cutting speed of 50 m./sec. (feed 166 mm./min., width of tooth 4 mm., pitch 6.8 mm.). Under these conditions, the life of the tool increased from .3 h. to 1.3 h. as the clearance angle was increased from 10° to 30°.

It appears that too little attention is paid to the clearance angle in practice whilst the importance of the slope is exaggerated. The opinion is then often expressed that it is only necessary to provide sufficient clearance to prevent the back of the tool from rubbing. Whilst this may be approximately true for steel, such small angles lead to rapid wear of the tool if employed on softer materials such as plastics.

The following table gives values suggested by the author:—

	Tool Angles.		
Materials to be worked.	Slope.	Clearance. (min. value.)	Lip (min.)
Soft steel	5°-15°	10°	60°
Silumin	,,	12°	50°
Electron	,,	15°	55°
Plastics	,,	25°	55°

It will be noted that the range of slope angles is the same for all the materials. It need only be sufficient to ensure a free flow of the working chips and has practically no effect on tool wear.

Performance of Mechanically Reconditioned and Chemically Sharpened Files. (H. Schallbroch and W. Bieling, Werkstatt and Betrieb, Vol. 75, No. 8, Aug., 1942, pp. 175-179.) (107/33 Germany.)

The mechanical reconditioning virtually consists of grinding off the teeth and fitting new teeth to the resulting steel blank. Since the subsequent hardening can never be as favourable as that carried out by the manufacturer of the original file (due to lack of knowledge of material specification) such reconditioned file seldom approach the performance of the original article. Moreover the grinding leads to a serious loss in strength due to loss of material and this cannot be applied to small thin files. As an alternative to this method of reconditioning, attempts have been made to utilise sand blasting, wire brushes or chemical treatment. The authors are primarily concerned with the latter method and carried out extensive experiments on files " resharpened " by the Zoppi and Ullmann methods respectively.

Zoppi Method (German Patent application Z. 23,562 VI/48d).

The files are first degreased in an alkaline bath and then freed from rust by immersion in a 50 per cent. HCC bath for 12 hours at room temperature. A mechanical treatment with rotating brushes is interposed at various stages of the treatment. The sharpening process proper is carried out in a 16 per cent. HNO_3 bath and lasts 10-20 minutes. The files are then washed and provided with a protection against corrosion.

Ullman Process (German Patent No. 709,248).

After degreasing, derusting and brushing as in the Zoppi process, the files are immersed in a bath of the following composition by weight:—

Copper sulphate	11.2
Concentrated H_2SO_4 (free from arsenic) .	27.5
Nitric acid	36.3
Potassium Dichromate	9.0
Water	500.0

The time of immersion is about 8-10 minutes. The file is then rinsed and any remaining acid neutralised.

By choosing the angle of immersion correctly, it is claimed that the clearance flank of the tooth is covered with a deposit of cover, the chemical etching effect then being concentrated on the steeper cutting edge.

Files reconditioned by both methods were tested in a special test rig, in which the file is reciprocated under load on a ball bearing steel. Records were kept of the gradual blunting of the file teeth (actual tooth profile photographed at grazing incidence). The wear of the steel specimen and the nature of the filings produced. It appears from these experiments that both the chemical methods described produce a marked improvement in the performance of the previously blunted file and that moreover the treatment can be repeated several times.

Creep Rates of Cold-Drawn Nickel-Copper Alloy (Monel Metal). (J. A. Bennett and D. J. McAdam, J. Res. Bureau of Stands., Vol. 28, No. 4, April, 1942, pp. 417-437.) (107/34 U.S.A.)

A description is given of new equipment recently assembled at this Bureau for testing the creep of metals.

The apparatus was used to study the creep rate of cold-drawn nickel-copper alloy over a wide range of stress and temperature. Each specimen was used for a series of tests, which allowed a more rapid determination of the characteristic creep rates than using a single specimen for each test. The data indicate that the characteristic creep rate depends only on the stress and temperature, and is not affected by prior stresses or temperatures. The influence of stress on the rate of creep increases with increasing stress, while the influence of temperature on the rate of creep decreases with increasing temperature. The results of the tests are shown in graphs, as no mathematical expression was found which would represent them.

Frictional Properties of Rubber. (F. L. Roth and others, J. Res. Bureau of Stands., Vol. 28, No. 4, April, 1942, pp. 439-462.) (107/35 U.S.A.)

Laboratory measurements of coefficients of friction of soft rubber compounds were made by towing specimens on horizontal tracks and by allowing them to slide down inclined tracks. The specimens were prepared by attaching the rubber to a metal backing and moulding it against glass surfaces having different degrees of roughness. The coefficients increase markedly with speed, ranging from about 1 at 10^{-4} cm./sec. to more than 4 at 5 cm./sec. The occurrence of vibrations prevented observations at higher speeds. Static friction is greater than dynamic friction for speeds appreciably less than 10^{-3} cm./sec. and less than dynamic friction for greater speeds. The coefficients decrease slightly with increasing pressures and are independent of the size of the specimen. Except at very low speeds the smoother surfaces yield the higher coefficients. Materials such as talc or bloom on the sliding surfaces cause large decreases in the coefficients.

Attention is called to the dependence of the coefficients of friction on the speed, which is shown in several previous investigations on rubber and other materials.

It appears that the coefficient of friction of a rubber compound depends more on the rubber metrix than on the corresponding ingredients and fillers.

Structural Changes in the Bonding Layer of Soft Soldered Joints in Copper Pipe Lines on Long Continued Heating. (W. H. Swanger and A. R. Maupin, J. Res. Bureau of Stands., Vol. 28, No. 4, April, 1942, pp. 479-487.) (107/36 U.S.A.)

In the course of previous investigations to establish the merits of soldered joints in copper-tube lines for domestic plumbing and other purposes, it became evident that in the evaluation of such joints consideration must be given to possible deterioration with time of the bond of the soldered joint if the service involves use at elevated temperatures. Joints made with solder containing tin were found to be susceptible to such a change, under favourable circumstances, whereas many lead-base solders were not. By means of metallographic studies of specimens cut from soldered joints held at elevated temperature for long periods, the nature of the microstructural change was established and correlated with the lowering of the bonding properties of the soldered joint. Essentially, this consists in the formation of a bonding layer adjacent to the copper base by alloying, by diffusion, of the tin of the solder and the adjacent copper. Microhardness determinations showed this constituent to be much harder than the initial solder and also harder than the copper base. Evidence of brittleness was also found. Most tin-free lead-base solders, including lead-silver solder, were found not to be susceptible of this change. Lead-cadmium solder was an exception.

Tensile and Compressive Properties of Some Stainless Steel Sheets. (C. S. Aitchison and others, J. Res. Bureau of Stands., Vol. 28, No. 4, April, 1942, pp. 499-567.) (107/37 U.S.A.)

Tensile and compressive tests were made on specimens from chromium-nickel (17-7 and 18-7) stainless-steel sheets, with cold-reductions from zero per cent. (annealed) to 50 per cent., and thicknesses from 0.01 to 0.06 in. The tensile yield strengths ranged from 34 to 200 kips/in^2. The effect of a stress-relieving treatment at 300° C. for 24 hours was investigated for one of the compositions.

The tensile tests were made on standard specimens. The compressive tests were made by the pack method developed at the National Bureau of Standards and by the cylinder method developed by Russell Franks, of the Union Carbide and Carbon Research Laboratories. Tests were made on both longitudinal and transverse specimens from each sheet.

The results are given in table and stress-strain curves to facilitate application in the design of light-weight structures from these materials. The effect of the degree of cold-reduction and of the stress-relieving treatments on the shape of the stress-strain curves and on the tensile and compressive properties is discussed.

Elimination of Oxide Films on Ferrous Materials by Heating in Vacuum. (V. C. F. Holm, J. Res. Bureau of Stands., Vol. 28, No. 5, May, 1942, pp. 569-579.) (107/38 U.S.A.)

In the bright annealing of stainless steels, extreme precautions are necessary and the partial pressure of oxygen must be kept at a very low value. This has been accomplished, in some cases, by the use of atmospheres formed by cracking anhydrous ammonia. Such atmospheres obviously have a high percentage of hydrogen and would tend to cause decarburization at the temperatures necessary for annealing. However, recent work on the effect of hydrogen in iron and steel has demonstrated that heating a metal in the gas may have other harmful effects.

The use of some chemically inert gas would be the ideal solution of the problem except that the removal of the last traces of oxygen presents difficulties. Utilisation of vacuum furnaces as a means of obtaining inert environments for annealing has been suggested, but for practical reasons these appear applicable only in relatively few instances. However, because vacuum heating offers a means of investigating the changes that occur during bright annealing without the effect of the usual gas-metal equilibria, it was felt that such a study might provide some pertinent information regarding the behaviour of metals in inert atmospheres at high temperatures.

An investigation of the mechanism by which lightly oxidized specimens of ferrous materials were brightened when heated in vacuum showed that the presence of carbon was essential. Oxidized specimens of iron containing small amounts of carbon were brightened in 15 to 20 minutes at 800° C., and the elimination of the oxide film was accompanied by decreases in the carbon content. Clean-up of oxide films on stainless steel occurred also when the specimens were heated to about 1,050° C. Oxidized high-purity iron which contained less than 0.001 per cent. of carbon could not be brightened by vacuum heating at temperatures up to 1,250° C. Vacuum heating of lightly oxidized specimens of high-purity iron sometimes caused the oxide film to agglomerate, forming distinct, geometric patterns that could be observed under the microscope.

Rate of Oxidation of Typical Non-Ferrous Metals as Determined by Interference Colours of Oxide Films. (D. J. McArthur and C. W. Geil, J. Res. Bureau of Stands., Vol. 28, No. 5, May, 1942, pp.593-635.) (107/39 U.S.A.)

An investigation has been made of the rate of oxidation of 18 non-ferrous metals by means of the interference colours of oxide films. With eight of these metals complete diagrams were obtained; with seven metals the approximate forms and positions of the graphs were obtained for interference colours of the first order; with three metals, only the approximate positions of the graphs were obtained. A comparison is made between the results obtained with these metals and with typical steels.

The diagrams obtained with these non-ferrous metals are similar to those obtained with steels. For a constant film thickness, the relation between temperature and oxidation time is linear when plotted with logarithmic co-ordinates. The variation of the film thickness either with time at constant temperature or with temperature for constant oxidation time, when plotted with logarithmic co-ordinates, is represented by a reversed curve When plotted with Cartesian co-ordinates, the variation of film thickness with time at constant temperature is represented by a curve without reversal; this is a complex curve becoming approximately parabolic at the upper end.

An attempt is made to correlate the forms and positions of the curves with the affinities of the metals for oxygen, with the resistances at the metal-oxide interface and with the resistivity of the oxide film. The variation of the rate of oxidation with the film thickness is such that it may be expressed in terms of an assumed variation of the resistivity with the film thickness. This means merely that the film behaves as if its resistivity (not necessarily its electrical resistance) varies in the manner described.

Compacting Steel Swarf by Auto-Combustion (Scrap Disposal). (Stahl und Eisen, Vol. 62, No. 44, 29/10/42, pp. 921-922.) (107/40 Germany.)

Steel wool or swarf is very awkward material to handle. If spread relatively thinly in the open, considerable space is required and if stacked to any height subsequent handling is made very difficult by interlocking.

Transport is very uneconomical since a 20 ton truck will not normally hold more than about five tons of swarf. Remelting at the steel works is also

difficult, the possible rate of addition to the normal charge being strictly limited (stoppage of flue and air filters especially if swarf is oily). The author describes a simple method of compacting the swarf by purely thermal means before despatch for disposal.

For this purpose the swarf is introduced into a simple type of vertical furnace (illustrated) and ignited by means of a small wood or coke fire. Once combustion has started, no fresh fuel need be added, the heat generated by the combustion of part of the bottom layer of swarf being sufficient to either melt the swarf or break it up into very small lengths. Less than 10 per cent. of the charge leaving the furnace is in the form of oxide, the remainder being metallic iron. In practice, the compacting furnace is set up in close proximity to the swarf mound and charged with a crane as required. The compacted product leaves the furnace at the bottom and is directed into a conveyor, the belt of which is continuously cooled with loamy water. The standard furnace will handle about two tons of swarf an hour, and the resultant product presents no difficulty when added to the normal charge of the blast, Siemens Martin or Electrifurnace. A large number of such furnaces are now in use, and by this means storage room is reduced, transport of swarf rendered economical and scrap recovery facilitated.

Rapid Determination of Magnetic Characteristics by Means of the Ferrograph. (F. Forster, Z.f. Metallk., Vol. 32, No. 6, June, 1940, pp. 184-190.) (107/42 Germany.)

The apparatus depends on the following principle three small search coils, A, B and C are placed inside a larger coil fed by the alternating current supply of the laboratory and thus subjected to a variable magnetic field $H \sin \omega t$. Under these conditions, Coil C experiences an $EMF = E_1 = K\,(dH/dt)$, where K is a constant. Coils A and B are exactly similar and connected in series in such a manner that the resultant EMF is zero. On inserting the specimen to be tested inside Coil A, this balance is upset and an $EMF = E_2 = D\,(dJ/dt)$ is generated, where J is the magnetisation induced in the specimen.

By means of suitable resistance and capacity circuits, both E_1 and E_2 are integrated electrically, amplified and led to the horizontal and vertical deflector plates of a cathode ray oscillograph, thus producing a direct visible record of the hysterisis loop of the specimen, which can be recorded photographically. Depending on whether the latter is magnetically soft or hard, the field strength can be adjusted between 0 and 2, and 0 and 2000 Oersted respectively. Small differences in magnetic quality can be shown up easily by inserting the two specimens in coils A and B and increasing the sensitivity of the J circuit (so called differential method). Due to the small size of the sample required, measurements can be carried out easily at elevated temperatures (up to 900° C.).

Modern electrical valves will operate at high amplification without distortion with the result that accurate values for the coercivity, saturation and remanence can be obtained by direct measurement from the diagrams making use of the sensitivity value selected.

The apparatus is specially suited for continuous control of specimen in wire form, the wire being passed through Coil B by means of an electric motor, whilst Coil A contains a short length of standard wire.

Experiments on magnetostriction are also easily carried out.

Characteristics of Wide Angle Aeroplane Camera Lenses (*R.P.* 1,498). (F. E. Washer, J. Res. Bur. Stands., Vol. 29, No. 3, Sept., 1942, pp. 233-246.) (107/43 U.S.A.)

The relative illumination in the focal plane was measured for a number of wide-angle aeroplane-camera lenses, using a method depending upon the determination of the light-transmitting area of the lens effective at definite orientations of the

lens. A new factor dependent on the lens design was found to be operative in reducing the values of the relative illumination in the unvignetted portion of the field for certain types of lenses. Determinations of the resolving power were also made and showed considerable variation in performance with type of lens. The effect of basing the distortion values upon the calibrated focal length instead of the equivalent focal length was determined.

X-Ray Measurement of the Thickness of the Cold-Worked Surface Layer Resulting from Metallographic Polishing (*R.P.* 1,494). (H. C. Vacher, J. Res. Bur. of Stands., Vol. 29, No. 2, Aug., 1942, pp. 177-181.) (107/44 U.S.A.)

A series of annealed specimens, each having a surface free from cold-work, was prepared from each of the following metals: steel (0.34 per cent. C.), copper, and aluminium. The surface was finished with one of several abrasives commonly used in preparing a surface for metallographic examination, and X-ray back-reflection patterns were obtained by using copper, cobalt, and chromium targets. The thicknesses of the layers altered by the abrasive treatments then were used to estimate the thicknesses of cold-worked layers between 2 and 25 microns on annealed steel, 2 and 42 microns on annealed copper, and 5 and 95 microns on annealed aluminium.

The experiments are described to illustrate the use of back-reflection X-ray patterns as a means of evaluating individual abrasive treatments employed in obtaining a metallographic polish.

Measurement of Degree of Roughness of High Quality Surfaces. (W. Lueg, Der Betrieb, Vol. 28, No. 8, Aug., 1942, p. 340.) (107/45 Germany.)

Mechanical profilographs are unsuitable for surface testing if the roughness is below 1μ. Such high degrees of smoothness are becoming increasingly common in certain classes of engineering products (super finish) and a simple method of evaluating the surface of the finished article is badly needed. As is well known, microscopic examination of the surface under conditions of dark field illumination reveals irregularity of a very small order (light scattering) and under certain conditions (grazing incidence) an indication of the surface profile can be obtained. This, however, still leaves the problem of obtaining a numerical estimate of the degree of finish for which various rather complicated methods have already been proposed (see for example the German text book, "Technische Ober-Flachenkunde"—G. Schmaltz).

The author has investigated an interesting modification of the optical method leading to a direct numerical evaluation of the average surface roughness by comparing the intensity of the light reflected from the surface under conditions of bright and dark field illumination to be symmetrical in azimuth, the integral of its light reflected under these conditions is independent of the direction of the surface scratches, provided the surface is perpendicular to the optic axis of the microscope. The reflected light falls on a photo cell and the corresponding current is measured on an electrometer by determining the time required to produce a certain charge. By thus separating the measuring and recording instruments, the method can be applied to the specimen whilst still clamped to the machine tool.

It is stated that the new method gives consistent results and that a direct comparison over the surface roughness range 1μ to 22μ as estimated from direct profile measurements (obtained optically by the so-called sectional method at grazing incidence) was also satisfactory. It is therefore claimed that the figures for surfaces of very high finish (for which a profile record is normally unobtainable are also trustworthy and much less ambiguous than those given by direct microscopic examination.

For various samples of steels, the light ratio values gave the following results:

(1)	Very finely ground . . .	62.9×10^{-2}
(2)	Lapped	16.3×10^{-2}
(3)	Normal polish	2.1×10^{-2}
(4)	Super polish	$.3 \times 10^{-2}$

Of the above, surface (1) had a maximum surface roughness of 1.2μ as measured by the grazing incidence (optical) and profilograph (mechanical) methods respectively. The surface finish in cases 2-4 was so high that these two checks could not be applied. It will, however, be noted that the new method had no difficulty in grading the surfaces.

By suitably adjusting the field of view and magnification, the new method can also be applied to curved surfaces of small radii of curvature.

Improved Instrument for Measuring the Air Permeability of Fabrics. (H. F. Schiefe and P. M. Boyland, J. Res. Bureau of Stands., Vol. 28, No. 5, May, 1942, pp. 637-642.) (107/46 U.S.A.)

This paper described a new model of an instrument for the direct measurement of the air permeability of fabrics. The air, which is drawn through the fabric by a given suction, is measured with orifice-type flowmeters. The instrument is mounted in the top of a table and a new clamping device is provided, which permit measurements to be made rapidly on any part of a large piece of cloth without cutting.

The calibration and operation of the instrument are discussed. Results of measurements on two very different types of fabrics—parachute cloth and blankets—are given for several methods of clamping. The values are expressed in cubic feet of air per min. per sq. ft. of fabric for a pressure difference of .5 in. of water and ranged from 80 to 120 for parachute fabric, 60 to 270 for blankets respectively. A suitable method of clamping is described for which the edge leakage is negligible. The random sampling error of the average of five tests for air permeability is less than 5 per cent. approximately nine times out of 10.

The Icing of Aircraft. (M. Robitzsch, Beitrage. z. Physik der freien Atmosphare, Vol. 18, No. 4, 1932, pp. 235-241.) (R.T.P. Translation No. T.M. 1,028.) (107/47 Germany.)

Starting from purely theoretical considerations, the author shows that the rate of ice deposition per unit surface of a body and fixed air flow conditions is given by

$$\left(\frac{C}{B}\right)(e_2 - E_1) = \left(\frac{C}{B}\right)\Delta$$

C = constant.

B = barometric pressure.

e_2 = partial pressure of water vapour in the air at temperature T_2.

E_1 = saturation pressure of water vapour referred to ice at temperature T_1 = surface temperature of body.

Other things being equal therefore, the rate of ice formation increases at altitude (reduction of B).

Δ = can be expressed more conveniently in the form:—

$$\Delta = E_1 \left[1 + .073\,(T_2 - T_1)\right] R_2 - E_1$$

where E_1 = saturation pressure of water vapour referred to water at T_1.

R_2 = saturation ratio of air at T_2.

Δ can now be plotted on a T_1 (body temperature) basis with $T_2 - T_1$ as abscissa and R_2 as parameter. With $R_2 = 1$ (saturated air) it appears that ice will only

deposit to any marked extent if the temperature of the air is substantially higher than that of the body. If, however, the air is supersaturated ($R_2 = 2$), ice will deposit even if the body is appreciably warmer than the surrounding air. The icing hazard is still further increased, if supercooled water is present in the air. Experiments show that the amount of such supercooled water may reach several gm. per kg. of air. Unfortunately this condition is not yet amenable to theoretical treatment, since only a portion of this water will freeze on striking the body.

The Formation of Ice on Aircraft. (W. Bleeker, Meteorological Zeitschrift, Sept., 1932 (R.T.P. Translation No. T.M. 1,027), pp. 349-354.) (107/48 Germany.)

It is generally recognised that the icing danger of aircraft is enhanced in the presence of supercooled water drops in the air but the reason for the sudden solidification of the drops on meeting the aeroplane is not yet clear. The author shows that the difference in the freezing point produced by changes in the radius of curvature of the drop when spread out on the wing cannot possibly account for the phenomenon, nor can the observed rate of ice accretion be reconciled with the difference in the saturation pressure of water with respect to the liquid and solid phase.

The author is of the opinion that the icing is mainly produced by rapid evaporation of the surface film in the high relative wind, and introduces the concept of the so-called " icing time " factor. This enables him to calculate the time required for a given quantity of water to freeze by " Ventilation." It appears that under favourable conditions an evaporation of 12 per cent. is sufficient to cause the remaining 88 per cent. to freeze.

The new factor introduced explains the possibility of ice accretion above the freezing point, and the peculiar mushroom appearance of the deposits on the leading edge of a wing. The question remains whether the quantity of water (in the form of drops) actually impinging on an aircraft in flight is sufficient to account by evaporation alone for the rate of ice formation observed. Obviously the drops will not follow the stream lines, if the latter are curved, but will be deflected by centrifugal action. Thus only a percentage will strike the aircraft. The author has examined the case of a circular boundary theoretically and concludes that even in this unfavourable case 10 per cent. of the drops in the space crossed by the circle are caught. This should be sufficient to account for the phenomena observed and the author therefore concludes that it is interception of the droplets rather than sublimation which plays the most important part in ice accretion.

Measurement of Ultra-Violet Solar and Sky Radiation Intensities in High Altitudes. (W. W. Coblentz and others, J. Res. Bureau of Stands., Vol. 28, No. 5, May, 1942, pp. 581-591.) (107/49 U.S.A.)

Data are given on the intensity of the biologically effective ultraviolet radiation, of wavelengths 3200 Å and shorter, from the sun and the entire sky, incident on a horizontal plane, under various meteorological conditions, in high latitudes. These data were secured by means of a photoelectric cell and automatic recording apparatus, whereby a continuous record of ultraviolet intensities, in absolute value, was obtained during the voyage of the Louise A. Boyd Arctic Expedition, up the west coast of Greenland to Etah (lat. 78.3° N.) and down the coast to Baffin Land and Labrador.

The outstanding results of this survey are, that, for the same solar heights, in the highest latitudes visited (78° N.) the ultraviolet intensities appear to be somewhat higher than in latitude 62° N., but somewhat lower than in latitude 39° N. (Washington), in agreement with expectation, taking into consideration the distribution of ozone in the stratosphere with latitude and the season. In the highest latitudes, at the noon hour, on the clearest days, in midsummer, the

intensity of the ultraviolet solar and sky radiation ranged from 30 to 40μW/cm^2, which is a significant value biologically, of especial interest to the medical profession in connection with the question of the incidence of rickets.

Carbon Dioxide Breathing at High Altitudes and its Effect on Oxygen-Want. (A. Rühl and W. Spiess, Luftfahrtmedizin, Vol. 1, No. 4, 24/4/37, pp. 272-291.) (107/50 Germany.)

Low atmospheric pressure at high altitudes not only reduces oxygen tension but also carbon-dioxide tension in the blood and alveolar air. This paper deals with the effect of CO_2 on the oxygen supply of the body. It is shown that the saturation of the arterial system is greatly improved by the addition of CO_2 to the inspired air. The latter increases breathing volume, improves the breathing mechanism and also favourably affects the acid-base equilibrium, as evidenced by the drop in the high lactic acid values and by the increase in alkali reserve.

The authors show that cramp due to low pressure can be promptly and effectively relieved by CO_2 breathing. In this respect CO_2 breathing is an effective antidote to altitude sickness and is certainly superior to other methods applied to cope with this condition.

In regard to the general problem of oxygen-want at high altitudes, the authors find that whilst the addition of CO_2 to the normal atmospheric air produced various beneficial results, it provided no completely satisfactory remedy against oxygen-want at altitudes of 6,000-6,500 m. It was, however, successful in preventing altitude sickness at altitudes in the region of 4,000-5,000 m., thus only effecting an extension of the altitude limit at which oxygen is normally applied.

Pulse Rate and Blood Pressure as Affected by Gradually Decreasing and Increasing Pressures in the Low Pressure Chamber. (Georg Besseres, Luftfahrtmedizin, Vol. 1, No. 4, 24th April, 1937, pp. 301-306.) (107/51 Germany.)

Twenty-one subjects were tested in the low compression chamber as regards fitness for altitude flying. Pulse rate and blood pressure were observed under gradual reduction of air pressure (corresponding to various altitudes) and then under gradually increasing pressures until normal atmospheric pressure was reached. A marked increase in pulse rate was observed at an altitude of 3,000 m. in the case of subjects not acclimatised to altitude. There was no uniformity of reaction among the subjects tested. In some cases there was even an initial decrease in pulse rate. To evaluate these differences the author shows that it is essential not only to consider the curves of pulse rate and blood pressure for gradual altitude ascent but also those obtained for the gradual descent from high altitude to normal atmospheric pressure.

The Time Reserve of Human Beings After Interruption of the Oxygen Supply at High Altitudes. (H. Strughold, Luftfahrtmedizin, Vol. 3, No. 1, 1938-1939, pp. 55-63.) (107/52 Germany.)

This paper discusses the problem of " time-reserve " which is defined as being the time elapsing between interruption of the oxygen supply and the occurrence of the first physiological disturbances. By means of the behaviour of the natural reflexes of the striated muscles it is shown that the time-reserve decreases with increasing altitude and that at altitudes of 8,000-9,000 m. the time-reserve would be a matter of seconds rather than minutes. This leads to the conclusion that if the oxygen supply is interrupted for any reason the pilot will have to get the aeroplane as quickly as possible out of this zone of pronounced oxygen deficiency into at least the upper region of the physiological atmosphere, *i.e.* into strata from 3,000-4,000 m.

Tests, however, showed large variations between individuals at different altitudes. In this connection the author considers the possibility of taking the

time-reserve as a measure of the suitability of pilots for high altitude flying. The shortness of the time of normal efficiency after discontinuing the breathing of oxygen of very high altitudes makes the time-reserve one of the most important factors in selecting high altitude flyers.

On the Causes and Prevention of Severe Internal Injuries in Gliding Accidents. The Problem of the Capacity of the Body to Endure Extreme Impact Shock is also Discussed. (S. Ruff, Luftfahrtmedizin, Vol. 3, No. 2, pp. 267-276, 1938-1939.) (107/53 Germany.)

Cases of severe internal injuries occurred in accidents involving the glider model Zögling commonly used in German gliding schools. It was noticed, for example, that when this glider landed somewhat heavily on frozen ground the damage to the glider was slight, whereas the pilot sustained serious kidney injury. These injuries always occurred in the part of the body close to the abdominal belt, the latter showing no evidence of damage in nearly all the cases reported. Investigations disclosed that these injuries were due mainly to the way the belt was attached, causing the impact load to bear directly on the stomach.

Various tests were then carried out to determine the impact pressure loads that arise on landing and methods were investigated whereby these pressure loads could best be absorbed. It was found that special oval-shaped rings incorporated in the abdominal belt reduced the impact loads to a minimum, the energy being absorbed by distortion of the rings. These oval rings were preferred to rubber shock-absorbers because of the recoil of the latter under impact.

The Oxygen Saturation of the Blood when Breathing CO at High Altitudes. (H. v. Diringshofen, Luftfahrtmedizin, Vol. 3, No. 2, 1938-1939, pp. 216-217.) (107/54 Germany.)

This paper supplements an earlier one by Diringshofen and Hartman (see Luftfahrtforschung, Vol. 12, No. 4, 37/7/35, pp. 121-3, R.T.P.3 Translation No. 1135). In that earlier study the authors discussed the conditions of oxygen saturation in the blood brought about at high altitudes and the modification of these conditions due to the presence of CO in the inspired air. It was then shown that small quantities of CO combine with the hæmoglobin with the result that part of this substance is rendered useless for the purpose of oxygen transport.

The author of the present paper shows, however, that the " additional altitude effect " attributed to CO is not as large as was suggested in the earlier paper. It is shown that CO does not directly affect the oxygen tension in the blood which is a factor of importance when considering altitude effects.

On the Problem of Acclimatization to Oxygen Deficiency at Low Pressure. (Hans Koltze and W. Kühn, Luftfahrtmedizin, Vol. 3, No. 2, 1938-1939, pp. 183-190.) (107/55 Germany.)

Tests were carried out in the low compression chamber on a number of subjects at various rate of ascent, repeated tests being carried out on the same subject. An improvement in both the electro cardiogram and general physical well-being was observed when the ascent to altitude was carried out at a low rate. This improvement was attributed not so much to the low rate of ascent but rather to the repeated residence in the low pressure chamber, in other words, to acclimatization. It was, however, not found possible to improve altitude tolerance beyond an altitude of 6,500 m. by a process of slow acclimatization.

The authors stress the importance of assessing flying efficiency by means of the electrocardiogram which, if it is to be of any real value, must be obtained by repeated tests in the low pressure chamber.

Development of Abnormal Symptoms in the Lungs and Heart as a Result of Adaptation to Flying Conditions.—(U. Schaare, Luftfahrtmedizin, Vol. 3, No. 2, 1938-1939, pp. 104-115.) (107/56 Germany.)

Certain abnormalities affecting the condition of the heart and lungs in the case of a number of Luftwaffe recruits who had already undergone more than one year's training, led to this investigation being carried out. These abnormalities consisted of a marked increase of blood in the lung vessels, enlargement of the heart accompanied by hypertrophy of the muscles, bradycardia, increased dimensions of the thorax, etc. The question whether these abnormalities were symptoms of injury due to oxygen-deficient breathing when flying at high altitudes is discussed. The author tends to the opinion that they are to be regarded as symptoms of physical adaptation to altitude which in no way affect flying efficiency.

LIST OF SELECTED TRANSLATIONS.

No. 52.

NOTE.—Applications for the loan of copies of translations mentioned below should be addressed to the Secretary (R.T.P.3), Ministry of Aircraft Production, and not to the Royal Aeronautical Society. Copies will be loaned as far as availability of stocks permits. Suggestions concerning new translations will be considered in relation to general interest and facilities available.

Lists of selected translations have appeared in this publication since September, 1938.

THEORY AND PRACTICE OF WARFARE (A.R.P.).

TRANSLATION NUMBER AND AUTHOR.	TITLE AND REFERENCE.
1638 ——	*Technical Standards for the Air Raid Protection of Japanese Buildings.* (Gas und Luftschutz, Vol. 2, No. 2, Sept., 1941, pp. 23-27.)
1641 Schneider, W. ...	*Earth and Air Vibrations Accompanying Explosions and Gunfire, and Their Effect on Structures.* (Gas u. Luftschutz, Vol. 2, No. 2, 1941, pp. 24-34, and No. 3, pp. 42-52.)

AERO AND HYDRODYNAMICS.

1624 Behrbohm, H. ... Pinl, M.	*On the Theory of Compressible Potential Flow, II.* (Z.A.M.M., Vol. 21, No. 6, Dec., 1941, pp. 341-350.)
1625 Behrbohm, H. ... Pinl, M.	*New Linearisation of the Fundamental Equation of the Two-Dimensional Adiabatic Compressible Potential Flow.* (Z.A.M.M., Vol. 21, No. 4, Aug., 1941, pp. 193-203.)

ENGINES AND ACCESSORIES.

1614 Lutz, O.	*Resonant Vibrations in Pipe Lines of Reciprocating Engines.* (Ber. a.d. Lab. f. Verb., No. 3, pp. 17-109.)
1617 ——	*Rotary Engine Valve.* (German Patent 702,413.) (Digest.) (A.T.Z., Vol. 44, No. 8, 25/4/41, p. 219.)
1618 ——	*Device for the Utilisation of Exhaust Gas Energy.* (Digest, German Patent 716,158.) (A.T.Z., Vol. 45, No. 8, 25/4/42, p. 227.)

FANS AND BLOWERS (U.S.S.R.).

1628 Struve, E. E. ...	*A Straight-Flow Centrifugal Fan.* (Trans., C.A.H.I., No. 211, 1935, pp. 266-275.)
1629 Struve, E. E. ... Surnov	*Reversible Fan of the C.A.H.I. Type.* (Trans., C.A.H.I., No. 211, 1935, pp. 276-284.)
1630 Kissina, L. A. ... Tchebyshova ...	*Friction Losses in Rotating Discs.* (Trans., C.A.H.I., No. 211, 1935, pp. 166-178.)

TRANSLATION NUMBER AND AUTHOR.		TITLE AND JOURNAL.
1631	Kalinushkin, M. P....	*A New Dust Fan of the C.A.H.I. Type.* (Trans., C.A.H.I., No. 211, 1935, pp. 255-265.)
1632	Ovchinnikov, V. ...	*The Parallel and Series Works of Fans.* (Trans., C.A.H.I., No. 211, 1935, pp. 186-202.)
1633	Ovchinnikov, V. ... Polikovsky, V. ...	*Steady Performance of Fans Working in Parallel.* (Trans., C.A.H.I., No. 211, 1935, pp. 203-216.)
1634	Polikovsky, V. ... Ovchinnikov, V. ...	*Investigation on the Influence of Different Variations in Design on the Performance of Centrifugal Sirroco Fans.* (Trans., C.A.H.I., No. 211, 1935, pp. 241-250.)
1635	Nevelson	*Investigation of a Rateau Fan System for Mine Ventilation.* (Trans., C.A.H.I., No. 211, 1935, pp. 215-240.)

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1616	Tammann, G. ... Bochow, K.... ...	*On the Absorption of Hydrogen by Rubber Under Increased Pressure and the Behaviour of Rubber After Release of Pressure.* (Z.A.A. Chemie, Vol. 168, No. 3-4, 1928, pp. 322-324.)
1636	Stager, H. ... ... Siegfried, W. ... Sanger, R.	*Investigations on Phenol Plastics.* (Schweizer Archiv., Vol. 7, Nos. 5, 6, 7, May-July, 1941, pp. 129-139, 153-174, 201-208.)

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1619	Steinhauser, K. ...	*Determination of Zinc in Aluminium and its Alloys, including Secondary Metal.* (Aluminium, Vol. 24, No. 5, May, 1942, pp. 173-176.)
1620	Steinhauser, K. ...	*Determination of Alumina in Aluminium.* (Aluminium, Vol. 24, No. 5, May, 1942, pp. 176-178.)
1621	Steinhauser, K. ... Aust, K. H.... ...	*Determination of Tin in Secondary Aluminium.* (Aluminium, Vol. 24, No. 5, May, 1942, pp. 172-173.)
1622	Stellies, A. J. ... Langer, P.	*Rapid Method of the Determination of Copper Manganese and Iron in Aluminium Alloys.* (Aluminium, Vol. 24, No. 5, May, 1942, pp. 169-172.)
1623	Geigenmuller, M. ...	*Determination of the Silicon in Silumin.* (Aluminium, Vol. 24, No. 5, May, 1942, pp. 178-179.)

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1615	Theis, A.	*Stress Determination and the Investigation of Mechanical Vibrations by Strip and Ring Gauges of the Electrical Resistance Type.* (Z. f. Tech. Physik, No. 11, 1941, pp. 273-280.)
1640	Teofilato, P. ...	*Mechanical Determination of the Differential Coefficients of a Given Function by Means of an Elastic Strip.* (Atti di Guidonia, No. 48, 1941, pp. 113-132.)

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1637	Strughold, H. ...	*New Results and Problems in Medical Stratosphere Research.* (Luftwissen, Vol. 9, No. 6, June, 1942, pp. 177-181.)

TITLES AND REFERENCES OF ARTICLES AND PAPERS SELECTED FROM PUBLICATIONS REVIEWED IN R.T.P.3.

Requests for further information or translations should be addressed to R.T.P.3, Ministry of Aircraft Production.

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2	5284	Germany ...	*New German Aircraft Types* (*Ju. 86P, Ju. 288, Me. 109G*). (Inter. Avia., No. 837-838, 7/10/42, p. 14.)
3	5285	U.S.A. ...	*Consolidated B-24 Liberator* (*Transport Version*). (Inter. Avia., No. 837-838, 7/10/42, p. 14.)
4	5288	U.S.A. ...	*Curtiss Electric Cannon Airscrew* (*Photo*). (Inter. Avia., No. 837-838, 7/10/42, p. 1.)
5	5291	Japan ...	*Mitsubishi S-00 Navy Fighter* (*Photograph*). (Inter. Avia., No. 837-838, 7/10/42, p. 1.)
6	5292	U.S.A. ...	*Boeing B-17F Armament.* (Inter. Avia., No. 837-838, 7/10/42, p. 20.)
7	5293	U.S.A. ...	*American Wooden Aircraft* (*AT 13, DRD-1, Krochler-Doak*). (Inter. Avia., No. 837-838, 7/10/42, pp. 20-21 and I.)

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9	5296	U.S.A.	...	*Curtiss SO3C-1 "Seagull" Reconnaissance Plane (Photograph).* (Inter. Avia., No. 837-838, 7/10/42, p. I.)
10	5297	G.B.	...	*Miles Master III (Recog. Details).* (Flight, Vol. 42, No. 1,765, 22/10/42, p. a.)
11	5298	U.S.S.R.	...	*Russian MIG3 Fighter (Photograph).* (Flight, Vol. 42, No. 1,765, 22/10/42, p. 445.)
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13	5320	U.S.A.	...	*CO_2 Fire Fighting.* (P. W. Eberhardt, Sci. Am., Vol. 166, No. 6, June, 1942, pp. 269-271.)
14	5321	G.B.	...	*Westland Whirlwind (Drawing).* (Aeroplane, Vol. 163, No. 1,639, 23/10/42, p. 469.)
15	5322	Germany	...	*Junkers Ju. S2/3M.* (Flight, Vol. 42, No. 1,763, 8/10/42, p. 390a.)
16	5323	Germany	...	*Gotha Gliders.* (Flight, Vol. 42, No. 1,762, 8/10/42, p. b.)
17	5324	Germany	...	*New German Transport Plane.* (Flight, Vol. 42, No. 1,763, 8/10/42, p. 394.)
18	5325	Japan	...	*Japanese Type Designations.* (Flight, Vol. 42, No. 1,763, 8/10/42, p. 394.)
19	5328	Germany	...	*Ju. 87D Dive Bomber (Photograph).* (Aeroplane, Vol. 63, No. 1,639, 23/10/42, p. 472.)
20	5329	U.S.A.	...	*C.G.4a Military Glider (Drawing).* (Aeroplane, Vol. 63, No. 1,639, 23/10/42, p. 473.)
21	5330	G.B.	...	*The British Air Mission to Japan in 1921.* (Aeroplane. Vol. 63, No. 1,639, 23/10/42, pp. 476-478.)
22	5331	G.B.	...	*Avro Lancaster I (Sectioned Drawing).* (Aeroplane, Vol. 63, No. 1,639, 23/10/42, pp. 479-482.)
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24	5333	G.B.	...	*Spitfire VB. (Recog. Details).* (Aeroplane, Vol. 63, No. 1,639, 23/10/42, p. 485.)
25	5334	U.S.A.	...	*Republic P47 Thunderbolt (Recog. Details).* (Aeroplane, Vol. 63, No. 1,639, 23/10/42, p. 485.)
26	5336	U.S.A.	...	*North American AT-6A Trainer (Steel-Plywood).* (Modern Plastics, Vol. 19, No. 10, June, 1942, pp. 45 and 98.)
27	5349	U.S.A.	...	*Martin B-26 (Photograph).* (Aeroplane, Vol. 63, No. 1.636, 2/10/42, p. 384.)
28	5350	U.S.A.	...	*Douglas B-23 (Photograph).* (Aeroplane, Vol. 63, No. 1,636, 2/10/42, p. 385.)
29	5351	U.S.A.	...	*American Turrets (North American Mitchell, Martin Marauder, Consolidated Liberator) (Photographs).* (Aeroplane, Vol. 63, No. 1,636, 2/10/42, p. 388.)

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34	5359	U.S.A.	...	*North American "Mustang" (Photograph).* (Flight, Vol. 63, No. 1,762, 1/10/42, p. 355.)
35	5360	U.S.A.	...	*Seversky on U.S. Fighter Performance.* (Flight, Vol. 42, No. 1,762, 1/10/42, pp. 357-358.)
36	5361	U.S.A.	...	*Converting U.S.A. Light Planes into Gliders.* (H. W. Perry, Flight, Vol. 42, No. 1,762, 1/10/42, pp. 360-361.)
37	5362	G.B.	...	*20 mm. Hispano Gun on Spitfire (Photograph).* (Flight, Vol. 42, No. 1,762, 1/10/42, p. 362.)
38	5363	G.B.	...	*Sunderland (Recog. Details).* (Flight, Vol. 42, No. 1,762, 1/10/42, p. a.)
39	5364	U.S.A.	...	*Catalina (Recog. Details).* (Flight, Vol. 42, No. 1,762, 1/10/42, p. b.)
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43	5371	U.S.A.	...	*Martin B26B Marauder (Photograph).* (Aeroplane, Vol. 63, No. 1,637, 9/10/42, p. 416.)
44	5372	Germany	...	*Leaders of the Luftwaffe (V).* (Aeroplane, Vol. 63, No. 1,637, 9/10/42, p. 419.)
45	5374	U.S.A.	...	*Glenn Martin 187 Baltimore I (Recognition Details).* (Aeroplane, Vol. 63, No. 1,637, 9/10/42, p. 427.)
46	5375	U.S.A.	...	*Lockheed Ventura (Recognition Details).* (Aeroplane, Vol. 63, No. 1,637, 9/10/42, p. 427.)
47	5380	Germany	...	*Example of Damage to German Aircraft in Combat (Photographs).* (Der Adler, No. 17, 25/8/42, pp. 520-521.)
48	5391	Germany	...	*The History of the German Military Air Transport.* (W.T.M., Vol. 46, No. 8, Aug., 1942, pp. 191-198.)
49	5392	U.S.S.R.	...	*The U.S.S.R. Automatic Infantry Rifle, Model 36 and 40.* (W.T.M., Vol. 46, No. 8, Aug., 1942, pp. 198-203.)
50	5393	G.B.	...	*The Organisation of the British Air Force.* (Inter. Avia., No. 837-838, 7/10/42, pp. 1-9.)
51	5423	Japan	...	*Mitsubishi OO Fighter.* (Autom. Ind., Vol. 87, No. 3, 1/8/42, pp. 19 and 70.)

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53	5427	Germany ...	*Dornier Do. 217E Bomber.* (M. W. Bourdon, Autom. Ind., Vol. 87, No. 3, 1/8/42, pp. 35-39.)
54	5471	Germany ...	*Technical Problems of Anti-Aircraft Batteries.* (K. Becker, Schriften Akad L.F.F., No. 23, 8/4/38, pp. 1-18.)
55	5472	Germany ...	*Some Notes on Technical Development of Air Fighting.* (F. N. Scheubel, Schriften Akad L.F.F., No. 24, 20/5/38, pp. 1-33.)
56	5502	Germany ...	*Sailing Flight Training in the German Air Force.* (Flugsport, Vol. 34, No. 20, 30/9/42, pp. 303-305.)
57	5508	Germany ...	*Ring Mounting for Hand Pointed Aircraft Guns (Pat. Series 38, No. 723,034).* (I. Karia, Flugsport, Vol. 34, No. 20, 30/9/42, p. 154.)
58	5509	Germany ...	*Gun Turret Mounting (Pat. Series 38, No. 723,485).* (L.A.B., Flugsport, Vol. 34, No. 20, 30/9/42, p. 154.)
59	5512	Canada ...	*R.A.F. Organisation (Air Ministry and Commands: Bomber, Fighter, Coastal, Middle East, Balloon, Maintenance and Ferry).* (Various Authors, Flying and Popular Aviation, Vol. 31, No. 3, Sept., 1942, pp. 41-104 and 252, 254, 262, 216, 220, 256.)
60	5513	Canada ...	*History of the R.A.F.* (Flying and Popular Aviation, Vol. 31, No. 3, Sept., 1942, pp. 177-181 and 180-188.)
61	5515	Canada ...	*Training and Manpower (R.A.F.).* (A. G. R. Garrod, Flying and Popular Aviation, Vol. 31, No. 3, Sept., 1942, pp. 107-110 and 206 and 215-216.)
62	5514	Canada ...	*Works Directorate (R.A.F.).* (E. Holloway, Flying and Popular Aviation, Vol. 31, No. 3, Sept., 1942, pp. 107-110 and 242.)
63	5517	Canada ...	*Signals and Radio (R.A.F.).* (C. W. Nutting, Flying and Popular Aviation, Vol. 31, No. 3, Sept., 1942, pp. 138-146.)
64	5518	Canada ...	*Air Intelligence (R.A.F.).* (E. H. Medhurst, Flying and Popular Aviation, Vol. 31, No. 3, Sept., 1942, pp. 141, 196 and 200-204.)
65	5520	Canada ...	*Air Sea Rescue (R.A.F.).* (E. F. Waring, Flying and Popular Aviation, Vol. 31, No. 3, Sept., 1942, pp. 152-154 and 275.)
66	5522	Canada ...	*Silhouettes of British Military Aircraft.* (Flying and Popular Aviation, Vol. 31, No. 3, Sept., 1942, pp. 182-184.)
67	5532	Germany ...	*Aircraft Torpedo Release Gear. Pat. Series No. 39 721,943 and 723,316).* (M. W. Neubrandenburg, Flugsport, Vol. 34, No. 21, 14/10/42, pp. 159-160.)

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68	5533	Germany	...	*Bomb Release Gear. Pat. Series No.* 39 (723,605). (M. W. Neubrandenburg, Flugsport, Vol. 34, No. 21, 14/10/42, p. 160.)
69	5535	G.B. ...	...	*Organisation of the British Air Force.* (Inter. Avia., No. 839-840, 19/10/42, pp. 1-10.)
70	5536	G.B. ...	...	*D.H.* 98 "*Mosquito.*" (Inter. Avia., No. 839-840, 19/10/42, pp. 19-20.)
71	5538	U.S.A.	...	*Fairchild AT-13* (*Photo*). (Inter. Avia., No. 839-840, 19/10/42, p. 1.)
72	5540	Germany	...	*Messerschmidt Me.* 109*G*. (Inter. Avia., No. 839-840, 19/10/42, pp. 22-23.)
73	5543	U.S.A.	...	*Mass Production of Vought Sikorsky VS-44.1.* (Inter. Avia., No. 839-840, 19/10/42, p. 25.)
74	5544	U.S.A.	...	*Douglas C-47 Transport.* (Inter. Avia.. No. 839-840, 19/10/42, p. 25.)
75	5545	U.S.A.	...	*New American Bomber B-27.* (Inter. Avia., No. 839-840, 19/10/42, p. 25.)
76	5546	G.B. ...	...	*High Speed Target Boats for Coastal Command Training.* (Inter. Avia., No. 839-840, 19/10/42, pp. 27-28.)
77	5547	Germany/ Japan	....	*Aircraft Carried by Submarines.* (Inter. Avia., No. 839-840, 19/10/42, p. 31.)
78	5549	U.S.A.	...	*Tail Gun on B-17F Bomber.* (Inter. Avia., No. 839-840, 19/10/42, p. 1.)
79	5559	U.S.A.	...	*Extra Wide Airscrew Blades of Lockheed Bomber "Ventura."* (Bee-Hive (United Aircraft), Vol. 16, No. 12, Dec., 1941, p. 15.)
80	5560	G.B. ...	...	*Fighter Armament* (*Modern Fixed Gun Installation*). (Flight, Vol. 42, No. 1,768, 12/11/42, pp. 518-522.)
81	5564	G.B. ...	...	*Spitfire V* (*Recog. Details*). (Flight, Vol. 42, No. 1,768, 12/11/42, p. a.)
82	5565	Italy ...	...	*Reggiane Re.* 2001 (*Recognition Details*). (Flight, Vol. 42, No. 1,768, 12/11/42, p. b.)
83	5566	U.S.S.R.	...	*Russian Method for Finding Night Targets* (A. Goryev, Flight, Vol. 42, No. 1,768, 12/11/42, p. 530.)
84	5567	U.S.A.	...	*Ryan P.T.-25 Plastic Trainer.* (Flight, Vol. 42, No. 1,768, 12/11/42, p. 531.)
85	5572	G.B. ...	...	*Avro Manchester Long Range Bomber.* (Flugwehr und Technik, Vol. 4, No. 10, Oct., 1942, p. 274.)
86	5573	Germany	...	*New German Gliders* (*24 m Span, 2,250 kg. Useful Load*). (Flugwehr und Technik, Vol. 4, No. 10, Oct., 1942, p. 275.)
87	5621	Germany	...	*The Interpolation of Family Curves with Special Reference to the Calculation of Shell Trajectories.* (R. Sauer, Z.A.M.M., Vol. 20, No. 5, Oct., 1940, pp. 280-284.)
88	5648	U.S.A.	...	*American Opinion on U.S. Aircraft* (*with British Comments*). (Aeroplane, Vol. 63, No. 1,642, 13/11/42, pp. 156-157.)

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91	5660	U.S.A.	...	*Army Glider Pilot Training.* (U.S. Air Services, Vol. 27, No. 9, Sept., 1942, pp. 15-46.)
92	5661	U.S.A.	...	*Curtiss "Helldiver" (Photo).* (U.S. Air Services, Vol. 27, No. 9, Sept., 1942, p. 12.)
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94	5705	U.S.A.	...	*Vultee Vengeance Dive Bomber taken over by U.S. Army Air Force (Vultee A-31 "Georgia").* (Inter. Avia., No. 841-842. 31/10/42, p. 19.)
95	5707	U.S.A.	...	*Lockheed-Vega "Ventura" (U.S. Army B-34).* (Inter. Avia., No. 841-842, 31/10/42, pp. 19-20.)
96	5708	Canada	...	*Canadian Production of Mosquito Aircraft.* (Inter. Avia., No. 841-842, 31/10/42, pp. 23-24.)
97	5709	G.B. ...	...	*Aircraft Conversions (Hampden, Mustang, Sea Hurricane, etc.).* (Inter. Avia., No. 841-842, 31/10/42, pp. 1 and 21.)
98	5710	Germany	...	*New German Flying Equipment (Ju. 288, He. 177).* (Inter. Avia., No. 841-842, 31/10/42. p. 25.)
99	5711	G.B. ...	...	*De Havilland Mosquito.* (Inter. Avia., No. 841-842, 31/10/42, p. 22.)
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103	5726	U.S.A.	...	*Air Power and Sea Strategy.* (J. A. Ward, Aero Digest, Vol. 41, No. 2, Aug., 1942, pp. 68-71 and 241-242.)
104	5734	U.S.A.	...	*Consolidated Catalina (Sect. Drawing).* (Aero Digest, Vol. 41, No. 2, Aug., 1942, pp. 152-153.)
105	5744	U.S.A.	...	*Martin "Mars" Patrol Bomber.* (Aero Digest, Vol. 41, No. 2, Aug., 1942, p. 194.)
106	5746	U.S.A.	...	*Improvised Bomb Sight (20 cents) Used on the Tokio Raid (The Greene Sight).* (Aero Digest, Vol. 41, No. 2, Aug., 1942, p. 214.)
107	5748	U.S.A.	...	*Comfortization of Military Aircraft (II).* (A. A. Arnhym, Aero Digest, Vol. 41, No. 2, Aug., 1942, pp. 220-236.)
108	5749	U.S.A.	...	*Boeing XPP-1 Patrol Bomber (Photograph).* (Aero Digest, Vol. 41, No. 2, Aug., 1942, p. 309.)
109	5780	G.B. ...	...	*De Havilland Mosquito.* (Engineer, Vol. 174, No. 4,529, 30/10/42, pp. 356-357.)
110	5784	G.B. ...	...	*Parnall Power Operated Gun Turret.* (Engineering, Vol. 154, No. 4,008. 6/11/42, pp. 366-367 and 378.)

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115	5816	Germany	...	*Bucker Bu.* 181 *(Bestmann).* (Aeroplane, Vol. 63, No. 1,641, 6/11/42, p. 541.)
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117	5818	U.S.A.	...	*Douglas Boston III (Recog. Details).* (Aeroplane, Vol. 63, No. 1,641, 6/11/42, p. 543.)
118	5819	G.B. ...	...	*Fire Power and Tail Turret.* (Aeroplane, Vol. 63, No. 1,641, 6/11/42, p. 552.)
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120	5833	G.B. ...	...	*Fire Power and the Tail Turret.* (Aeroplane, Vol. 63, No. 1,640, 30/10/42, p. 500.)
121	5839	G.B. ...	...	*De Havilland Mosquito.* (Aeroplane, Vol. 63, No. 1,640, 30/10/42, p. 500.)
122	5835	U.S.A.	...	*North American B.25 Mitchell (Photo).* (Aeroplane, Vol. 63, No. 1,640, 30/10/42, p. 504.)
123	5836	Germany	...	*Leaders of the Luftwaffe, VIII.* (Aeroplane, Vol. 63, No. 1,640, 30/12/42, p. 507.)
124	5838	U.S.A.	...	*American Criticism of Their Aircraft.* (Aeroplane, Vol. 63, No. 1,640, 30/10/42, pp. 510-511.)
125	5839	G.B. ...	...	*Experiences of the British Air Mission to Japan,* 1921-1922. (Aeroplane, Vol. 63, No. 1,640, 30/10/42, pp. 512-513.)
126	5840	G.B. ...	...	*Fowler Flaps in Westland "Whirlwind" (Photo).* (Aeroplane, Vol. 63, No. 1,640, 30/10/42, pp. 519 and 520.)
127	5857	G.B. ...	...	*De Havilland Mosquito.* (Flight, Vol. 42, No. 1,766, 29/10/42, pp. 466-467.)
128	5858	G.B. ...	...	*Fairey Fulmar (Recog. Details).* (Flight, Vol. 42, No. 1,766, 29/10/42, p. a.)
129	5859	U.S.A.	...	*Arado Ar.* 196 *(Recog. Details).* (Flight, Vol. 42, No. 1,766, 29/10/42, p. b.)
130	5860	U.S.A.	...	*Some Arado Types* (80, 199, 198, 81). (Flight, Vol. 42, No. 1,766, 29/10/42, pp. 473-477.)
131	5878	Germany	...	*Tail Guns on F.W.* 198 *(Photograph).* (Flight, Vol. 42, No. 1,767, 5/11/42, p. 498.)
132	5879	G.B. ...	...	*Bristol Beaufort II (Recog. Details).* (Flight, Vol. 42, No. 1,767, 5/11/42, p. a.)
133	5880	Italy ...	...	*Savoia Marchetti S.M.* 84 *(Recog. Details).* (Flight, Vol. 42, No. 1,767, 5/11/42, p. b.)

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134	5881	G.B.	...	*Parnall Hydraulic Gun Turret Operation.* (Flight, Vol. 42, No. 1,767, 5/11/42, pp. 502-503.)
135	5893	Germany	...	*Air Attacks on Convoys (Illustrated).* (Luftwelt, Vol. 9, No. 19, 1/10/42, pp. 362-371.)
136	5897	Germany	...	*Internal Ballistics—on the Pressure Required to Force Guide Ring Through the Rifling.* (F. Gabriel, W.T.M., Vol. 46, No. 9, Sept., 1942, pp. 223-224.)
137	5898	G.B.	...	*New Spitfire with Merlin LXI Engine and Four-Bladed Airscrew (Photo).* (Aeroplane, Vol. 63, No. 1,644, 27/11/42, p. 612.)
138	5899	G.B.	...	*Supermarine Seafire (Spitfire Vc Modified for Deck Landing (Photo).* (Aeroplane, Vol. 63, No. 1,644, 27/11/42, p. 614.)
139	5900	U.S.A.	...	*Douglas C53 (Dakota II) Transport (Photo).* (Aeroplane, Vol. 63, No. 1,644, 27/11/42, pp. 616 and 617.)
140	5901	Germany	...	*Leaders of the Luftwaffe.* (Aeroplane, Vol. 63, No. 1,644, 27/11/42, p. 619.)
141	5902	G.B.	...	*Parachutes, II (Historical).* (C. G. Grey, Aeroplane, Vol. 63, No. 1,644, 27/11/42, pp. 620-621.)
142	5903	G.B.	...	*Advantages of Rearward Fire, with Photographs of Representative Rear Turrets.* (W. S. Shackleton, Aeroplane, Vol. 63, No. 1,644, 27/11/42, pp. 622-625.)
143	5905	U.S.A.	...	*Consolidated C-87 Transport (Liberator) (Photograph).* (Aeroplane, Vol. 63, No. 1,644, 27/11/42, p. 633.)
144	5908	U.S.A.	...	*Consolidated "Catalina" (Sectional Drawing).* (Autom. Ind., Vol. 87, No. 4, 15/8/42, pp. 30-31.)
145	5910	G.B.	...	*Spitfire V in Production.* (Autom. Ind., Vol. 87, No. 4, 15/8/42, pp. 36-39 and 82.)
146	5911	U.S.S.R.	...	*Russian Military Aircraft.* (M. W. Bourdon, Autom. Ind., Vol. 87, No. 4, 15/8/42, pp. 40-42 and 72-74.)
147	5915	U.S.A.	...	*Crowell Ground Trainer.* (Flugsport, Vol. 34, No. 23, 11/11/42, pp. 346-347.)
148	*5924	Germany	...	*Installation of Fixed Guns in the Wing Root Joint (Pat. Series 41, No. 726,326).* (Heinkel, Flugsport, Vol. 34, No. 23, 11/11/42, pp. 167-168.)
149	5925	Germany	...	*Fuselage Turrets (Pat. Series 41, No. 726,209).* (Heinkel, Flugsport, Vol. 34, No. 23, 11/11/42, p. 168.)
150	5928	G.B.	...	*New Spitfire (Merlin 61 Engine and Four-Bladed Airscrew) (Photo).* (Flight, Vol. 42, No. 1,769, 19/11/42, p. 545.)
151	5930	Germany	...	*Blohm and Voss Ha. 138 (Recog. Details).* (Flight, Vol. 42, No. 1,769, 19/11/42, p. a.)
152	5931	U.S.A.	...	*Martin 162 "Mariner" (Recog. Details).* (Flight, Vol. 42, No. 1,769, 19/11/42, p. b.)

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153	5932	G.B.	...	*Fighter Armament, II (Modern Gun Installations).* (Flight, Vol. 42, No. 1,769, 19/11/42, pp. 553-557.)
154	5933	G.B.	...	*Torpedo Bombers.* (L. W. Rosenthal, Flight, Vol. 42, No. 1,769, 19/11/42, pp. 561-562.)
155	5939	G.B.	...	*New Spitfire with Merlin 61 Engine (Photograph).* (Aeroplane, Vol. 63, No. 1,643, 20/11/42, pp. 583 and 586.)
156	5940	Germany	...	*Dornier Do. 217 E2 Bomber (Photograph).* (Aeroplane, Vol. 63, No. 1,643, 20/11/42, p. 558.)
157	5941	Germany	...	*Leaders of the Luftwaffe (XI),* (Aeroplane, Vol. 63, No. 1,643, 20/11/42, p. 591.)
158	5942	G.B.	...	*Glider Training in the A.T.C.* (Aeroplane, Vol. 63, No. 1,643, 20/11/42, p. 592.)
159	5943	G.B.	...	*Parachutes, I.* (C. G. Grey, Aeroplane, Vol. 63, No. 1,643, 20/11/42, pp. 594-595.)
160	5944	U.S.A.	...	*Grumman G-44 (Gosling) (Recog. Details).* (Aeroplane, Vol. 63, No. 1,643, 20/11/42, p. 597.)
161	5945	U.S.A.	...	*Grumman G21B (Goose) (Recog. Details).* (Aeroplane, Vol. 63, No. 1,643, 20/11/42, p. 597.)
162	5947	U.S.A.	...	*American Transport Aircraft.* (Aeroplane, Vol. 63, No. 1,643, 20/11/42, p. 605.)
163	5948	G.B.	...	*Advantages of Rear Fire.* (Aeroplane, Vol. 63, No. 1,643, 20/11/42, p. 606.)
164	5949	G.B.	...	*Catapult Training.* (Flight, Vol. 42, No. 1,770, 26/11/42, pp. 575-577.)
165	5950	U.S.A.	...	*Douglas Dauntless (Recog. Details).* (Flight, Vol. 42, No. 1,770, 26/11/42, p. a.)
166	5951	Germany	...	*Junkers Ju. 87B (Recog. Details).* (Flight, Vol. 42, No. 1,770, 26/11/42, p. b.)
167	5952	Various	...	*Fighter Armament, III (German, American, Russian and Japanese).* (Flight, Vol. 42, No. 1,770, 26/11/42, pp. 579-584.)
				AERODYNAMICS AND HYDRODYNAMICS.
168	5420	Germany	...	*Basic Factors Influencing Shear Board Design of Deep Water Trawling Nets (Reduction of Drag).* (B. C. Grosskopf, W.R.H., Vol. 23, No. 16, 15/8/42, pp. 221-224.)
169	5422	Germany	...	*Flexible Fairing for Ship Rudders (Pat. No. 713,600).* (T. Schneider, W.R.H., Vol. 23, No. 16, 15/8/42, p. 229.)
170	5455	Germany	...	*Sound Propagation by Swiftly Moving Bodies.* (L. Prandtl, Schriften Akad L.F.F., No. 7, 18/2/38, pp. 1-14.)
171	5480	Germany	...	*Compressibility Effects in Air Flow.* (L. Prandtl, Schriften Akad L.F.F., No. 30, 12/11/37, pp. 1-15.)
172	*5609	Germany	...	*The Elliptical Wing Examined on the Basis of Potential Theory.* (K. Krienes, Z.A.A.M., Vol. 20, No. 2, April, 1940, pp. 65-68.)
173	5616	Germany	...	*The Rotary Motion of a Fluid Above a Fixed Plane.* (U. T. Bodenwadt, Z.A.M.M., Vol. 20, No. 5, Oct., 1940, pp. 241-254.)

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174	5617	Germany	...	*The Transition from Subsonic to Supersonic Flow of Gas.* (H. Gortler, Z.A.M.M., Vol. 20, No. 5, October, 1940, pp. 254-262.)
175	*5623	Germany	...	*Effect of Aspect Ratio on the Relation Between Normal and Tangential Force on a Wing.* (D. Kuchemann, Z.A.M.M., Vol. 20, No. 5, Oct., 1940, pp. 284-290.)
176	5624	Germany	...	*Discussion on the Exact Solution of the Differential Equation of an Adiabatic Gas Flow (Shock Line and Limiting Lines).* (W. Tollmien and F. Ringleb, Z.A.M.M., Vol. 20, No. 5, Oct., 1940, pp. 295-296.)
177	5637	U.S.A.	...	*A Simplified Two-Dimensional Theory of Thin Airfoils.* (H. J. Stewart, J. Aeron. Sci., Vol. 9, No. 12, Oct., 1942, pp. 452-456.)
178	*5639	U.S.A.	...	*A Simple Method of Applying the Compressibility Corrections in the Determination of True Air Speed.* (W. C. Schoolfield, J. Aeron. Sci., Vol. 9, No. 12, Oct., 1942, pp. 457-464.)
179	5721	Germany	...	*The Navier-Stokes Stress for Viscous Fluids.* (E. Mohr, L.F.F., Vol. 18, No. 9, Sept. 20, 1941.) (R.T.P. Translation No. T.M. 1,029.)
180	5743	U.S.A.	...	*North American New Wind Tunnel.* (Aero Digest, Vol. 41, No. 2, Aug., 1942, p. 193.)
181	5758	U.S.A.	...	*Increased Importance of Small Scale Models in Ship Research (Based Mainly on Work Carried Out in the U.S.A.).* (W. Hintertham, W.R.H., Vol. 23, No. 18, 15/9/42, pp. 247-250.)
182	5766	U.S.A.	...	*Pressure Drop in the Flow of Compressible Fluids.* (W. E. Lobo and others, Ind. and Eng. Chem. (Ind. Ed.). Vol. 34, No. 7, July, 1942, pp. 821-823.)
183	5927	U.S.S.R.	...	*The Nature of the Destruction Action of Cavitation.* (M. Kornfeld and L. Smorov, J. of Physics, U.S.S.R., Vol. 6, No. 1-2, 1942.)
184	5938	Germany	...	*Potential Theory of the Vibrating Circular Wing (Part II—Numerical Calculations).* (K. Krienes and Th. Schade, L.F.F., Vol. 19, No. 8, 20/8/42, pp. 282-291.)
185	5954	U.S.A.	...	*Two-Dimensional Potential Flow Past an Arbitrary Thick Wing Profile.* (F. Keune, Jahrbuch 1938 der deutschen, L.F.F., Vol. 1, pp. 3-26.) (R.T.P. Translation No. T.M. 1,023.)
186	5955	U.S.A.	...	*The Stability of Laminar Flow Past a Sphere.* (J. Pretsch, L.F.F., Vol. 18, No. 10, 27/10/41.) (R.T.P. Translation No. 1,526 and T.M. No. 1,017.)
187	5956	U.S.A.	...	*On the Symmetrical Potential Flow of Compressible Fluid Past a Circular Cylinder in the Tunnel in the Subcritical Zone.* (E. Lamla, L.F.F., Vol. 17, No. 10, 26/10/40.) (R.T.P. Translation No. T.M. 1,018.)

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			AIRCRAFT AND ACCESSORIES.
188	5282	France ...	*New French Aircraft or Projects* (*Bloch* 157, 161, 162. 800, *SO* 90/91, *SO* 30*N*, *SO* 30*R*). (Inter. Avia., No. 837-838, 7/10/42, pp. 11-13.)
189	5283	France ...	*S.E.* 700 *Gyroplane*. (Inter. Avia., No. 837-838, 7/10/42, pp. 13-14.)
190	5287	U.S.A. ...	*American Cargo Planes* (*B*-24, *Curtiss C*-76 (*C*-46?), *C*-69 (*L*-49), *C*-60 (*L*-18), *JR*-25 (*VS*-44), *JRF* (*Grumman*)). (Inter. Avia., No. 837-838, 7/10/42, pp. 16-17 and I.)
191	5289	U.S.A.	*Budd Stainless Steel Transport Planes Project*. (Inter. Avia., No. 837-838, 7/10/42, pp. 17-18.)
192	5290	U.S.A. ...	*Cargo Transport Difficulties* (*Fuel Supply*). (Inter. Avia., No. 837-838. 7/10/42, pp. 18-19.)
193	5294	U.S.A. ...	*U.S. Mobile Crane for Repair and Maintenance* (*Photograph*). (Inter. Avia., No. 837-838, 7/10/42, p. I.)
194	5307	G.B.	*Bibliography of Published Information on Runways* (1, *General*; 2, *Drainage*; 3, *Methods of Melting Ice and Snow*). (R.T.P.3, Bibliography No. 67, Oct., 1942.)
195	5376	G.B.	*Rotol Airscrew Development* (*including Cable Cutting Edge*). (Aeroplane, Vol. 63, No. 1,637, 9/10/42, p. 433.)
196	5431	U.S.A. ...	*Giant Lifting Crane for Aircraft* (*Photo*). (Autom. Ind., Vol. 87, No. 3, 1/8/42, p. 52.)
197	5443	Germany ...	*Aircraft Performance Improvements*. (W. Messerschmitt, Schriften Akad L.F.F., No. 1, 1/3/38, pp. 23-31.)
198	5445	Germany ...	*Measures for Improving the Zeppelin Airships for Long Distance Flights*. (L. F. Durr, Schriften Akad L.F.F., No. 2, 17/7/38, pp. 15-30.)
199	5446	Germany ...	*Development of the Zeppelin Airship for Long Distance Flights*. (A. Ehrle, Schriften Akad L.F.F., No. 2, 17/7/38, pp. 33-47.)
200	5453	Germany ...	*Problems and Present Development of Blind Landing System*. (P. F. Handel, Schriften Akad L.F.F., No. 6, 27/1/39, pp. 4-27.)
201	5466	Germany ...	*On the Stability of the Helicopter*. (B. Schlippe and R. Dietrich, Schriften Akad L.F.F., No. 16, 15/7/39, pp. 1-61.)
202	5470	Germany ...	*Autogyro and Helicopter Problems*. (H. Focke, Schriften Akad L.F.F., No. 22, 26/11/37, pp. 1-57.)
203	5478	Germany ...	*Problems of High Altitude Flight*. (A. Hansen, Schriften Akad L.F.F., No. 29, 28/10/37, pp. 1-34.)
204	5479	Germany ...	*Report on the Design of High Altitude Aircraft*. (H. Wagner, Schriften Akad L.F.F., No. 29, 28/10/37, pp. 35-56.)
205	5481	Germany ...	*The Resistance Problem of High Speed Flight*. (A. Busemann, Schriften Akad L.F.F., No. 30, 12/11/37, pp. 17-36.)

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206	5482	Germany ...	*Problems of High Speed Flight.* (W. Messerschmitt, Schriften Akad L.F.F., No. 31, 26/11/37, pp. 1-24.)
207	5485	Germany ...	*Inertia Effects of the Airscrew During a Turn.* (R. Grammel, Schriften Akad L.F.F., No. 36, 25/4/41, pp. 1-23.)
208	5488	Germany ...	*Fundamental Equations of Flight Mechanics.* G. A. Crocco, No. 38, 20/3/41, pp. 3-169.)
209	*5490	U.S.A. ...	*Tricycle Landing Gear Design (Part 2).* (E. S. Jenkins and A. F. Donovan, J. Aeron. Sciences, Vol. 9, No. 11, Sept., 1942, pp. 397-410.)
210	5492	U.S.A. ...	*Rotor Bending Moments in Plane of Flapping.* (A. Klemin and others, J. Aeron. Sciences, Vol. 9, No. 11, pp. 411-418.)
211	5505	Germany ...	*Device for Closing Gap in Slotted Flaps (Pat. Series 38, No. 724,233).* (Junkers, Flugsport, Vol. 34, No. 20, 30/9/42, p. 153.)
212	5506	Germany ...	*Mounting for Automatic Nose Slots on Wings (Pat. Series 38, No. 724,312).* (Arado, Flugsport, Vol. 34, No. 20, 30/9/42, p. 153.)
213	5507	Germany ...	*Controllable Mounting of Wing Nose Spoiler and Interconnection with Flap Mechanism (Pat. Series 38, No. 724,126).* (Messerschmitt, Flugsport, Vol. 34, No. 20, 30/9/42, p. 153.)
214	5510	Germany ...	*Spherical Tyres for Aircraft Wheels (Pat. Series 38, No. 724,314).* (D.V.L., Flugsport, Vol. 34, No. 20, 30/9/42, pp. 155-156.)
215	5511	Germany ...	*Retractable Undercarriages (Pat. Series 38, No. 722,977).* (Henschel, Flugsport, Vol. 34, No. 20, 30/9/42, p. 156.)
216	5524	Germany ...	*Oil Seal for Variable Pitch Airscrew Blade Foot Mounting (Pat. Series 39, No. 724,362).* (G. Schwarz, Flugsport, Vol. 34, No. 21, 14/10/42, p. 157.)
217	5525	Germany ...	*Automatic Pitch Changing Mechanism (Pat. Series 39, No. 724,317).* (Alfa Romeo, Flugsport, Vol. 34, No. 21, 14/10/42, pp. 157-158.)
218	5531	Germany ...	*Evaporative Heating Circuit for Aircraft Cabins (Pat. Series 39, No. 723,857).* (Dornier, Flugsport, Vol. 34, No. 21, 14/10/42, p. 159.)
219	5534	Germany ...	*Flexible Mounting for Airfield Surface Lights (Retract Undercarriage Pressure) (Pat. Series 39, No. 723,807).* (Pintsch, Flugsport, Vol. 34, No. 21, 14/10/42, p. 160.)
220	5542	Sweden ...	*Glider Construction in Sweden.* (Inter. Avia., No. 839-840, 19/10/42, p. 24.)
221	5548	... ...	*Giant Flying Boat S.E. 200 (Photograph).* (Inter. Avia., No. 839-840, 19/10/42, p. I.)
222	5563	Germany ...	*Floating Landing T for Seaplane Bases.* (Flight, Vol. 42, No. 1,768, 12/11/42, p. 526.)
223	5571	Switzerland ...	*Flutter of Aircraft Wings without Separation of Flow.* (G. Datwyler, Flugwehr und Technik, Vol. 4, No. 10, Oct., 1942, pp. 270-274.)

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224	5603	U.S.A. ...	*Requirements for Aircraft Oil Servicing Equipment for the War Effort.* (C. W. McAllister, S.A.E. Preprint, October Meeting, 1942, pp. 1-11.)
225	5626	Switzerland ...	*Aerodynamic Design of Strut Roots and Fairings.* (W. Pfenninger, Flugwehr und Technik, Vol. 4, No. 9, Sept., 1942, pp. 237-241.)
226	*5635	Germany ...	*Conversion Tables for Airscrew Coefficients.* (W. Weinig, Aerodynamics of the Airscrew (Text Book).)
227	5636	U.S.A. ...	*Vector Methods of Flutter Analysis.* (W. M. Bleakney and J. D. Hamm, J. Aeron Sci., Vol. 9, No. 12, Oct., 1942, pp. 439-451.)
228	*5640	U.S.A. ...	*Propeller Forces Due to Yaw and Their Effect on Aircraft Stability.* (L. B. Rumph and others, J. Aeron. Sci., Vol. 9, No. 12, Oct., 1942, pp. 465-470.)
229	5662	U.S.A. ...	*Synthetic Rubber Fuel Tanks.* (U.S. Air Services, Vol. 27, No. 9, Sept., 1942, p. 24.)
230	5702	France ...	*New Type Breguet Helicopter G* 10.1. (Inter. Avia., No. 841-842, 31/10/42, pp. 26-28.)
231	5704	G.B.	*Rotol Airscrews Development (Electrical Operation).* (Inter. Avia., No. 841-842, 31/10/42, p. 23.)
232	*5714	France ...	*High Speed Aircraft, Arsenal V.G.* 50. (Inter. Avia., No. 841-842, 31/10/42, p. 28.)
233	5715	France ...	*Sea Rudder of Latecoere* 631 *Giant Flying Boat.* (Inter. Avia., No. 841-842, 31/10/42, pp. I and 28.)
234	5716	France ...	*Flight Trials of Potez Scan* 161 *Giant Flying Boat.* (Inter. Avia., No. 841-842, 31/10/42, p. 28.)
235	5717	France ...	*100-Ton Flying Boats—French Project.* (Inter. Avia., No. 841-842, 31/10/42, p. 29.)
236	5729	U.S.A. ...	*Fire Truck for Airports.* (Aero Digest, Vol. 41, No. 2, Aug., 1942, p. 106.)
237	5730	U.S.A. ...	*Technique in Aerobatic Manœuvres.* (C. C. Ferranti, Aero Digest, Vol. 41, No. 2, Aug., 1942, pp. 124-128 and 247.)
238	5735	U.S.A. ...	*Diehls Static Stability Coefficient.* (M. M. Munk, Aero Digest, Vol. 41, No. 2, Aug., 1942, pp. 154 and 236-237.)
239	5740	U.S.A. ...	*Handley Tricycle Landing Gears.* (J. A. Johnson, Aero Digest, Vol. 41, No. 2, Aug., 1942, pp. 174-181 and 191.)
240	5791	G.B.	*Servicing Civil Aircraft.* (Engineer, Vol. 174, No. 4,530, 6/11/42, pp. 387-388.)
241	5808	G.B.	*Aircraft Protective Treatment.* (W. L. Morse, Aeronautics, Vol. 7, No. 3, Oct., 1942, pp. 44-47.)
242	5809	G.B.	*Electrical Layout on Aircraft.* (G. H. G. Garbett, Aeronautics, Vol. 7, No. 3, Oct., 1942, pp. 52-56.)
243	5837	G.B.	*Messier Hydraulic Control, Type C.* (Aeroplane, Vol. 63, No. 1,640, 30/10/42, pp. 508-509.)
244	5855	U.S.A. ...	*Lockheed Pressure Chamber for Tests of Entire Pressurized System Under Simulated Altitude Conditions.* (F. P. Dillon and others, J. Aeron. Sciences, Vol. 1, No. 6, Sept., 1942, pp. 13-15.)

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245	5856	U.S.A.	...	*De-Icer Servicing and Installation* (*Goodrich*). (J. Aeron. Sciences, Vol. 1, No. 6, Sept., 1942, pp. 17-27.)
246	5896	Germany	...	*Some Notes on Slow Speed Aircraft.* (W.T.M., Vol. 46, No. 9, Sept., 1942, pp. 216-215.)
247	5904	G.B. ...	...	*Plastic Bond for Wood Blades.* (Aeroplane, Vol. 63, No. 1,644, 27/11/42, p. 627.)
248	5906	U.S.A.	...	*Manufacture of Curtiss Propellers.* (J. Geschelin, Autom. Ind., Vol. 87, No. 4, 15/8/42, pp. 20-25.)
249	*5912	Germany	...	*New Horten High Altitude Glider of the Flying Wing Type with Parabolic Wings.* (G. Horten, Flugsport, Vol. 34, No. 23, 11/11/42, pp. 341-351.)
250	5913	Germany	...	*Tailless Parasol Monoplane Go.* 147. (Flugsport, Vol. 34, No. 23, 11/11/42, p. 345.)
251	5916	Germany	...	*Boundary Layer Control by Suction or Pressure* (*Pat. Series* 41, *No.* 725,477). (Junkers, Flugsport, Vol. 34, No. 23, 11/11/42, p. 165.)
252	5917	Germany	...	*Aileron or Flap Mechanism Ensuring Smooth Curvature at the Hinges* (*Pat. Series* 41, *No.* 726,323). (D.V.L., Flugsport, Vol. 34, No. 23, 11/11/42, p. 165.)
253	*5918	Germany	...	*Drag Reduction at High Speeds by Inducing Supersonic Vibrations of the Surface* (*Pat. Series* 41, *No.* 726,324). (Messerschmitt, Flugsport, Vol. 34, No. 23, 11/11/42, pp. 165-166.)
254	5920	Germany	...	*Tiltable Wing Nose* (*Pat. Series* 41, *No.* 725,768). (Messerschmitt, Flugsport, Vol. 34, No. 23, 11/11/42, p. 166.)
255	5921	Germany	...	*Adjustable Wing Nose* (*Pat. Series* 41, *No.* 726,206). (D.V.L., Flugsport, Vol. 34, No. 23, 11/11/42, p. 167.)
256	*5922	Germany	...	*Locking Device for Aircraft Control Surfaces* (*Pat. Series* 41, *No.* 726,207). (Fieseler, Flugsport, Vol. 34, No. 23, 11/11/42, p. 167.)
257	5923	Germany	...	*Interconnection of Throttle and High Lift Devices on Aircraft* (*Pat. Series* 41, *No.* 726,335). (Henschel, Flugsport, Vol. 34, No. 23, 11/11/42, pp. 167-168.)
258	5925	Germany	...	*Retractable Undercarriage* (*Pat. Series* 41, *No.* 725,307). (Junkers, Flugsport, Vol. 34, No. 23, 11/11/42, p. 168.)
259	5929	G.B. ...	...	*The Aerial Mercantile Marine* (*Flying Boat*). (J. A. Sizer, Flight, Vol. 42, No. 1,769, 19/11/42, pp. 547-551.)
260	5937	Germany	...	*The Calculation of Static Longitudinal Stability in Power Flight.* (R. Schubert, L.F.F., Vol. 19, No. 8, 20/8/42, pp. 271-281.)
261	5946	France	...	*French Commercial Flying Boat.* (Aeroplane, Vol. 63, No. 1,643, 20/11/42, pp. 604-605.)
262	5953	G.B. ...	...	*Hydulignum Blades for Airscrew* (*Impregnated Wood, Compressed both Flat and Edgewise*). (Flight, Vol. 42, No. 1,770, 26/11/42, pp. 586-587.)

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263	5957	U.S.A.	...	*Strength Tests on Hulls and Floats.* (K. Matthews, Jahrbuch 1938 der deutschen L.F.F., Vol. 1, pp. 342-347.) (R.T.P. Translation T.M. 1,019.)
				ENGINES AND ACCESSORIES.
264	5286	G.B.	... ...	*Turbine Airscrew Combinations, II.* (G. Geoffrey Smith, Flight, Vol. 42, No. 1,765, 22/10/42.)
265	5303	G.B.	... ...	*Bibliography of Published Information (including Translations) on Engine Exhaust (1, Methods of Analysis; 2, Smoke Density; 3, Composition of Exhaust and Mixture Strength; 4, CO Poisoning; 5, Detection of Inflammable Vapours; 6, Flame Traps).* (R.T.P.3, Bibliography No. 71, Oct., 1942.)
266	5308	G.B.	... ...	*Bibliography of Published Information (including Translations) on Oil Engines (General).* (R.T.P.3, Bibliography No. 66, Oct., 1942.)
267	5309	G.B.	... ...	*Bibliography of Published Information (including Translations) on Oil Engines (Named Types).* (R.T.P.3, Bibliography No. 65, Oct., 1942.)
268	5316	U.S.A.	...	*Solar Power Plants.* (J. A. Sibley, Sci. Am., Vol. 166, No. 6, June, 1942, pp. 284-286.)
269	5326	G.B.	... ...	*Gipsy Queen, IV.* (Flight, Vol. 42, No. 1,763, 8/10/42, pp. 395-396.)
270	5353	G.B.	... ...	*Bristol Hercules Power Unit.* (Aeroplane, Vol. 63, No. 1,636, 2/10/42, pp. 394-397.)
271	5367	France	...	*Future French Aircraft Engines.* (Flight, Vol. 42, No. 1,762, 1/10/42, p. 371.)
272	5370	G.B.	... ...	*Supercharged Version of "Gipsy Queen."* (Aeroplane, Vol. 63, No. 1,637, 9/10/42, p. 413.)
273	5373	Japan	...	*Mitsubishi Kinsei Aero Engine.* (Aeroplane, Vol. 63, No. 1,637, 9/10/42, pp. 420-421.)
274	5379	G.B.	... ...	*Railway Bearing Metals.* (J. N. Bradley and H. O'Neill, Engineering, Vol. 154, No. 4,006, 23/10/42, pp. 339-340.)
275	5381	G.B.	... ...	*Railway Bearing Metals.* (J. N. Bradley and H. O'Neil, Engineer, Vol. 174, No. 4,528, 23/10/42, pp. 347-348.)
276	5414	G.B.	... ...	*Lubrication of Steam Engines.* (F. J. Matthews, Sheet Metal Industries, Vol. 16, No. 186, Oct., 1942, pp. 1497-1498.)
277	5419	G.B.	... ...	*Bronze Bearings.* (Sheet Metal Industries, Vol. 16, No. 186, Oct., 1942, p. 1,570.)
278	5426	U.S.A.	...	*Diesel Engine Lubrication.* (P. M. Heldt, Autom. Ind., Vol. 87, No. 3, 1/8/42, pp. 26-28 and 70-72.)
279	5428	U.S.A.	...	*Al.-Bronze for Sleeve Valves.* (Autom. Ind., Vol. 87, No. 3, 1/8/42, p. 39.)
280	5444	Germany	...	*Development of the Aircraft Engine.* (O. Mader, Schriften Akad L.F.F., No. 1, 1/3/38, pp. 35-43.)
281	5450	Germany	...	*Some Dynamic Problems Connected with Piston Engines.* (R. Grammel, Schriften Akad L.F.F., No. 5, 13/1/39, pp. 1-17.)
282	5451	Germany	...	*Vibrations of the Engine Airscrew System.* (L. Lurenbaum, Schriften Akad L.F.F., No. 5, 13/1/39, pp. 19-44.)

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283	5462	Germany	...	*Experiments with Engine Cylinders of Geometrically Similar Design but Different Sizes with Notes on Future Aero Engine Development.* (W. Kamm, Schriften Akad L.F.F., No. 12, 3/3/39, pp. 1-33.)
284	5464	Germany	...	*Aero Engine Cooling, the Resistance Problem.* (H. Helmbold, Schriften Akad L.F.F., No. 14, 17/5/39, pp. 1-14.)
285	5473	Germany	...	*Limits and Lines of Development of the Aero Engine.* (F. Neugebauer, Schriften Akad L.F.F., No. 26, 21/1/38, pp. 1-20.)
286	5498	U.S.A.	...	*The Use of Expander Type of Rings to Prevent Excessive Cylinder Reconditioning.* (P. E. Friend, S.A.E. Preprints, Transport Meeting, New York, Oct. 7-8, 1942.)
287	5526	Germany	...	*Cooling Air Control for Cowling of Radial Engines (Pat. Series 39, No. 723,998).* (B.M.W., Flugsport, Vol. 34, No. 21, 14/10/42, p. 158.)
288	5527	Germany	...	*Cowled Engine Radiator Installation (Pat. Series 39, No. 723,545).* (Henschel, Flugsport, Vol. 34, No. 21, 14/10/42, p. 158.)
289	5528	Germany	...	*Cowled Engine Radiator Installation (Pat. Series 39, No. 724,231).* (D.V.L., Flugsport, Vol. 34, No. 21, 14/10/42, p. 158.)
290	5529	Germany	...	*Hydraulic Gear Control for Supercharger or Airscrew Drives (Pat. Series 39, No. 723,806).* (B.M.W., Flugsport, Vol. 34, No. 21, 14/10/42, pp. 158-159.)
291	5537	France	...	*Gnome-Rhone 17R and 18R Engine (14 and 18-Cylinder Twin-Row Radials, 1,600 and 2,200 h.p. respectively).* (Inter. Avia., No. 839-840, 19/10/42, pp. 21-22.)
292	5555	Germany	...	*High Duty Plastic Bearings (from the German).* (Plastics, Vol. 6, No. 66, Nov., 1942, pp. 395-396.)
293	5562	U.S.A.	...	*Plastic Baffles in American Radial Engines.* (Flight, Vol. 42, No. 1,768, 12/11/42, pp. 518-522.)
294	5573	France	...	*Hispano 122 12-Cylinder Water-Cooled V Engine (1,500 h.p.) and 24-Cylinder H Engine (3,000 h.p.).* (Flugwehr und Technik, Vol. 4, No. 10, Oct., 1942, p. 275.)
295	5578	U.S.A.	...	*Diesel Engine Working Costs (from the U.S.A.).* (Engineering, Vol. 154, No. 4,007, 30/10/42, p. 352.)
296	5602	U.S.A.	...	*Surface Finish of Journals (Effect on Friction Wearing-in and Seizure).* (R. W. Dayton and others, Mech. Eng., Vol. 64, No. 10, Oct., 1942, pp. 718-726.)
297	5630	...	...	*Centrifugal Pumps in Exhaustors.* (F. Kluge, Z.V.D.I., Vol. 86, No. 41-42, 17/10/42, pp. 623-628.)
298	5647	U.S.A.	...	*Duplex Cyclone.* (Aeroplane, Vol. 63, No. 1,642, 13/11/42, p. 155.)
299	5712	G.B.	...	*De Havilland Gipsy Six 111S (300 h.p. Take-off).* (Inter. Avia., No. 841-842, 31/10/42, p. 22.)

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300	5738	U.S.A. ...	*Elimination of Dust and Dirt from the Air Intake.* (Aero Digest, Vol. 41, No. 2, Aug., 1942, pp. 160 and 237-241.)
301	5747	Germany ...	*B.M.W. 801A Engine.* (Aero Digest, Vol. 41, No. 2, Aug., 1942, p. 217.)
302	5781	G.B.	*Present-Day Design of the Velox Boiler.* (Engineer, Vol. 174, No. 4,529, 30/10/42, pp. 364-366.)
303	5782	G.B.	*Boilers—Past and Present, I.* (S. J. Thompson, Engineer, Vol. 174, No. 4,529, 30/10/42, pp. 356-357.)
304	5788	G.B.	*Boilers—Past and Present, II.* (S. J. Thompson, Engineer, Vol. 174, No. 4,530, 6/11/42, pp. 376-378.)
305	5789	G.B.	*The Origin of the Internal Combustion Engine.* (A. K. Bruce, Engineer, Vol. 174, No. 4,530, 6/11/42, pp. 383-385.)
306	5810	G.B.	*Supercharged Magneto with Integral Pump (Pat. No. 545,540).* (British Thomson-Houston Co., Aeronautics, Vol. 7, No. 3, Oct., 1942, pp. 58-59.)
307	5812	G.B.	*Bristol Hercules "Power Egg."* (Aeroplane, Vol. 63, No. 1,641, 6/11/42, p. 529.)
308	5823	Germany ...	*The Dive Bomber Engine (from the German).* (Light Metals, Vol. 5, No. 58, Nov., 1942, pp. 446-447.)
309	5854	U.S.A. ...	*Aircraft Engine Installation.* (E. C. Sulzman, J. Aeron. Sciences, Vol. 1, No. 6, Sept., 1942, pp. 5-11.)
310	5865	G.B.	*S.V. Carburettor, II (Jets, Needles, Capsules, Testing).* (F. C. Sheffield, Airc. Prod., Vol. 4, No. 48, Oct., 1942, p. 591.)
311	5882	G.B.	*Hercules Power Plant (Standardised Mounting).* (Flight, Vol. 42, No. 1,767, 5/11/42, pp. 504-507.)
312	5883	Japan ...	*Mitsubishi Kinsei Engine.* (Autom. Ind., Vol. 87, No. 1, 1/7/42, pp. 22-25 and 74-78.)
313	5884	U.S.A. ...	*Excess Air Coefficient and B.M.E.P. for Two and Four-Stroke Engines, with Note on Scavenging Efficiency.* (Autom. Ind., Vol. 87, No. 1, 1/7/42, pp. 26-27.)
314	5914	Germany ...	*Four-Bank Six-Cylinder Radial Engine with Crank Throws in One Plane (Pat. No. 711,137).* (Junkers, Flugsport, Vol. 34, No. 23, 11/11/42, p. 346.)
315	5936	Germany ...	*Friction Heat in Turbo Machinery.* (O. Pabst, L.F.F., Vol. 19, No. 8, 20/8/42, pp. 267-270.)
			FUELS AND LUBRICANTS.
316	5410	G.B.	*Summary of Work for Two Weeks Ending 3rd and 10th October, 1942, Issued by the Fuel Research Intelligence Section.*
317	5411	G.B.	*Summary of Work for Two Weeks Ending 19th and 26th Sept., 1942, Issued by the Fuel Research Intelligence Section.*
318	5429	G.B.	*Substitute Fuels in G.B.* (N. Clarke Jones, Autom. Ind., Vol. 87, No. 3, 1/8/42, pp. 40-44 and 76-78.)

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319	5457	Germany	...	*Co-operative Fuel Testing in Germany* (15 *Papers*). (Various authors, Schriften Akad L.F.F., Book 9, 10-11/5/39, pp. 1-377.)
320	5474	G.B. ...	...	*Progress and Prospects of Fuels and Lubricants for Aero Engines.* (M. Muller and Conradi, Shriften Akad L.F.F., No. 27, 10/12/37, pp. 1-9.)
321	5575	U.S.A.	...	*Oil Transport in Synthetic Containers.* (Engineering, Vol. 154, No. 4,009, 13/11/42, p. 388.)
322	5608	U.S.A.	...	*Use of Mixtures of Oil and Coal in Boiler Furnaces.* (W. C. Schroeder, A.S.M.E., October Meeting, 1942 (Preprints of Papers).)
323	5657	G.B. ...	...	*Fuel Research Intelligence Section.* (Summary for Three Weeks Ending 17th, 24th and 31st, 1942.)
324	5751	Germany	...	*High Grade Motor Spirit from Peat.* (Ind. and Eng. Chem. (News Ed.), Vol. 20, No. 18, 25/9/42, p. 1,176.)
325	5775	U.S.A.	...	*Future Source of Power* (*Possible Uses of Photo-Chemical Reactions*). (Scientific American, Vol. 167, No. 4, Oct., 1942, p. 166.)
326	5806	G.B. ...	...	*Condition of Freshly Burnt Gases.* (A. G. Gaydon, Nature, Vol. 150, No. 3,808, 24/10/42, pp. 481-483.)
327	5935	Germany	...	*Researches on Preliminary Chemical Reactions in Spark Ignition Engines.* (E. Muhlner, L.F.F., Vol. 19, No. 8, 20/8/42, pp. 249-266.)
				MATERIALS AND ELASTICITY.
328	5304	G.B. ...	...	*Bibliography of Published Information on Wood and Cellulose Plastics.* (R.T.P3, Bibliography No. 70, Oct., 1942.)
329	5305	G.B. ...	...	*Bibliography of Published Information on Synthetic Glues.* (R.T.P.3, Bibliography No. 69, Oct., 1942.)
330	5306	G.B. ...	...	*Bibliography of Published Information on Cements.* (R.T.P.3, Bibliography No. 68, Oct., 1942.)
331	5315	U.S.A.	...	*Failure of Root Crops as a Possible Supply of Natural Rubber.* (Sci. Am., Vol. 166, No. 6, June, 1942, pp. 276-277.)
332	5335	U.S.A.	...	*Plastics in Gas Mask Construction.* (Modern Plastics, Vol. 19, No. 10, June, 1942, pp. 35-43 and 108.)
333	5337	U.S.A.	...	*Vinsol Resin from Pine Wood.* (Modern Plastics, Vol. 19, No. 10, June, 1942, pp. 59 and 112.)
334	5338	U.S.A.	...	*Fillers—Swelling Properties and Structure.* (Modern Plastics, Vol. 19, No. 10, June, 1942, pp. 65-69 and 102.)
335	5339	U.S.A.	...	*High Impact Moulding Compounds.* (Modern Plastics, Vol. 19, No. 10, June, 1942, pp. 70-71.)
336	5340	U.S.A.	...	*Delectine—a New Insulating Material.* (Modern Plastics, Vol. 19, No. 10, June, 1942, pp. 72-74.)
337	5341		...	*Surface Irregularities of Clear Plastics* (*Method of Test*). (Modern Plastics, Vol. 19, No. 10, June, 1942, p. 75.)
338	5342	U.S.A.	...	*Plastic Army Helmet Liner* (*U.S.A.*). (Modern Plastics, Vol. 19, No. 9, May, 1942, pp. 35-38.)

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339	5344	U.S.A.	...	*Lignin Plastics Development.* (Modern Plastics, Vol. 19, No. 9, May, 1942, pp. 46-47.)
340	5345	U.S.A.	...	*High Density Plywood.* (T. D. Perry, Modern Plastics, Vol. 19, No. 9, May, 1942, pp. 61-63 and 110.)
341	5346	U.S.A.	...	*Viniglidene Chloride Resin Tubing.* (C. B. Branch and D. L. Gibb, Modern Plastics, Vol. 19, No. 9, May, 1942, pp. 64-67.)
342	5354	G.B. ...	...	*Stresses on Cylinder Studs.* (Aeroplane, Vol. 63, No. 1,636, 2/10/42, p. 406.)
343	*5356	Germany	...	*Loading Hatches of Ships (Steel V. Wood Covering).* (G. Buchsbaum, J. d. Schiffbantechn. Gesell, Vol. 39, 1938, pp. 369-388.)
344	5365	G.B. ...	...	*Plastics on Aircraft, III.* (W. Nicholls, Flight, Vol. 42, No. 1,762, 1/10/42, pp. 368-370.)
345	*5377	G.B. ...	...	*Plastics in Engineering.* (J. Prior, Engineering, Vol. 154, No. 4,006, 23/10/42, pp. 324-325,)
346	5385	G.B. ...	...	*Phosphorus in Steel (Distribution by Radioactive Particles).* (Mech. World, Vol. 112, No. 2,907, 18/9/42, p. 269.)
347	5386	G.B. ...	...	*Hard Soldering of Aluminium.* (Mech. World, Vol. 112, No. 2,907, 18/9/42, p. 274.)
348	5387	...	...	*Corrugated Expansion of Pipes.* (Mech. World, Vol. 112, No. 2,907, 18/9/42, pp. 276-278.)
349	5388	G.B. ...	...	*Strength of Steel Wires.* (J. T. McIntyre, Mech. World, Vol. 112, No. 2,907, 18/9/42, pp. 279-281.)
350	5413	G.B. ...	...	*Volumetric Determination of C. in Steel.* (Sheet Metal Industries, Vol. 16, No. 186, Oct., 1942, p. 1,488.)
351	5415	G.B. ...	...	*Theory and Practise of Polarographic Analysis.* (G. H. Jeffery, Sheet Metal Industries, Vol. 16, No. 186, Oct., 1942, pp. 1,525-1,530 and 1,549.)
352	5416	G.B. ...	...	*Rust Proofing of Ferrous Metals (Cementation, Calorising, Cladding, etc.).* (H. Silman, Sheet Metal Industries, Vol. 16, No. 186, Oct., 1942, pp. 1,531-1,536.)
353	5417	G.B. ...	...	*Crack Detection by Fluorescent Light.* (Sheet Metal Industries, Vol. 16, No. 186, Oct., 1942, pp. 1,557-1,558.)
354	5418	G.B. ...	...	*Spot Welding of Nickel, Monel and Inconel.* (W. F. Hess and A. Muller, Sheet Metal Industries, Vol. 16, No. 186, Oct., 1942, pp. 1,563-1,568 and 1,570.)
355	5421	Germany	...	*Copper Cladding for Steel and Aluminium.* (W.R.H., Vol. 23, No. 16, 15/8/42, pp. 227-228.)
356	5438	G.B. ...	...	*The Application of Electricity to the Annealing of Glass Bottles and Containers.* (E. S. Morris, J. Inst. Elect. Engs., Vol. 89, Pt. II, No. 20, Aug., 1942, pp. 355-368.)
357	*5441	Germany	...	*The Application of Electric Welding in Commercial Shipbuilding.* (P. Classen, Jb. der Schiffbautechnischen Gesellschaft, Vol. 40, 1939, pp. 69-109.)

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358	5448	Germany	...	*The Structure of Metals.* (P. Delbye, Schriften, Akad L.F.F., No. 4, 16/12/38, pp. 1-13.)
359	5449	Germany	...	*The Use of Scientific Knowledge in Technical Problems Dealing with Metallurgy.* (G. Masing, Schriften Akad L.F.F., No. 4, 16/12/18, pp. 15-27.)
360	5465	Germany	...	*On the Fatigue Fracture of Metals.* (F. Korber, Schriften Akad L.F.F., No. 15, 31/3/39, pp. 1-53.)
361	5493	U.S.A.	...	*Tension and Compression Stress-Strain Characteristics of Cold Rolled Chromium-Nickel and Cr.-Mn.-Ni. Stainless Steels.* (R. Franks and W. O. Binder, J. Aeron. Sciences, Vol. 9, No. 11, Sept., 1942, pp. 419-438.)
362	5499	U.S.A.	...	*Metal Coating of Automotive Parts.* (H. S. Ingham and J. E. Wakefield, S.A.E. Preprints, Transport Meeting, New York, Oct. 7-8, 1942.)
363	5503	Germany	...	*Welding of Electron and Hydronalium.* (Flugsport, Vol. 34, No. 20, 30/9/42, pp. 303-305.)
364	5504	Germany	...	*Buckling and Ultimate Shearing Stress for Beech Plywood (Diagrams for Rapid Calculation).* (Flugsport, Vol. 34, No. 20, 30/9/42, pp. 303-305 a/b.)
365	5523	Germany	...	*Plastics in Aircraft Construction.* (H. Stener, Flugsport, Vol. 34, No. 21, 14/10/42, pp. 315-320.)
366	5550	Germany	...	*Valves in Polyvinyl Chloride.* (Plastics, Vol. 6, No. 66, Nov., 1942, pp. 380-383.)
367	5551	G.B.	...	*Rubber-like Substances from Cellulose.* (Plastics, Vol. 6, Nov., 1942, p. 383.)
368	5552	G.B.	...	*Fillers for Plastics.* (E. E. Halls, Plastics, Vol. 6, No. 66, Nov., 1942.)
369	5553	Italy	...	*Italian Shell Container Made of Plastics.* (Plastics, Vol. 6, No. 66, Nov., 1942, p. 394.)
370	5554	Germany	...	*Permissible Working Temperatures of Plastics.* (Plastics, Vol. 6, No. 66, Nov., 1942, p. 395.)
371	5556	Japan	...	*Weathering Tests on Cellulose Acetate and Cellulose Nitrate Films (from the Japanese).* (Plastics, Vol. 6, No. 66, Nov., 1942, p. 396.)
372	5557	Germany	...	*Welding of Polyvinyl Plastics (from the German).* (Plastics, Vol. 6, No. 66, Nov., 1942, pp. 396-397.)
373	5558	G.B.	...	*Electro-Chemical Aspect of High Polymeric Systems.* (B. T. Brajnikoff, Plastics, Vol. 6, No. 66, Nov., 1942, pp. 411-420.)
374	5568	U.S.A.	...	*Contribution to the Design of Plywood Shells.* (S. Blumrich, L.F.F., Vol. 18, No. 9, 20/9/41.) (R.T.P. Translation 1,454 and T.M. 1,031.)
375	5579	G.B.	...	*Formation of Hair-Line Cracks in Steel.* (J. H. Andrews and others, Engineering, Vol. 154, No. 1,007, 30/10/42, p. 357.)

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376	5580	Germany	...	*New Developments in Permanent Magnet Steels (Annealing in a Magnetic Field).* (Stahl und Eisen, Vol. 62, No. 43, 22/10/42, pp. 906-907.)
377	5581	U.S.A.	...	*Effect of Cr. on the Scaling Resistance of Cast Iron (from the U.S.A.).* (Stahl und Eisen, Vol. 62, No. 43, 22/10/42, p. 908.)
378	5582	Germany	...	*Modern Heat Treatment for Steel, with Special Reference to Replacement Steels.* (Stahl und Eisen, Vol. 62, No. 43, 22/10/42, p. 911.)
379	5583	Germany	...	*German Al. Alloy Specifications (Identification No., Composition, Uses).* (Aluminium, Vol. 24, No. 10, Oct., 1942, pp. 333-336.)
380	5585	Germany	...	*The Intermediate Annealing of Thin Al. or Al Alloy Strips (Cold Rolled).* (H. Wolf and others, Aluminium, Vol. 24, No. 10, Oct., 1942, pp. 341-347.)
381	5586	Germany	...	*Brinell Hardness of Al. Alloys (Minimum Thickness of Material, Distance Between Impressions and Trim of Application of Load).* (E. V. Rajakovics and H. O. Maier, Aluminium, Vol. 24, No. 10, Oct., 1942, pp. 341-347.)
382	5587	Germany	...	*Corrosion of Al. Alloy in Presence of SO_2 (Effect of Surface Measurement).* (L. Koch and E. Fenner, Aluminium, Vol. 24, No. 10, Oct., 1942, pp. 354-357.)
386	5592	Germany	...	*Shear Strength of Light Alloy Sheet.* (H. Guth, Aluminium, Vol. 24, No. 10, Oct., 1942, pp. 257-358.)
387	*5593	U.S.A.	...	*Torsional and Flexural Buckling of Bars of Thin-Walled Open Section Under Compressive and Bending Loads.* (J. N. Goodier, J. App. Mech., Vol. 9, No. 3, Sept., 1942, pp. 103-107.)
388	5594	U.S.A.	...	*Distribution of Stress in Built-in Beams of Narrow Rectangular Cross-Section.* (F. B. Hildebrand and E. Reissner, J. App. Mech., Vol. 9, No. 3, Sept., 1942, pp. 108-116.)
389	*5595	U.S.A.	...	*Buckling of Semi-Monocoque Structures Under Compression.* (T. R. Wang, J. App. Mech., Vol. 9, No. 3, Sept., 1942, pp. 117-121.)
390	5596	U.S.A.	...	*Graphical Analysis of Impact of Elastic Bars.* (K. J. De Juhasz, J. App. Mech., Vol. 9, No. 3, Sept., 1942, pp. 122-128.)
391	*5597	U.S.A.	...	*Some Dynamic Properties of Rubber.* (C. O. Harris, J. App. Mech., Vol. 9, No. 3, Sept., 1942, pp. 129-135.)
392	5599	U.S.A.	...	*Solution of Problems of Elasticity by the Framework Method (Discussion).* (J. App. Mech., Vol. 9, No. 3, Sept., 1942, pp. 144-145.)
393	5600	U.S.A.	...	*The Technical Cohesive Strength of Metals (Discussion).* (J. App. Mech., Vol. 9, No. 3, Sept., 1942, pp. 145-146.)

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394	5601	U.S.A. ...	*Sand Heap Analogy for Plastic Torsion Problems (Discussion).* (J. App. Mech., Vol. 9, No. 3, Sept., 1942, pp. 146-147.)
395	*5604	U.S.A. ...	*High Density Plywood.* (M. Finlayson, A.S.M.E., October Meeting, 1942, Preprints of Papers, pp. 1-21.)
396	*5605	U.S.A. ...	*Elastic Properties of Curved Tubes.* (I. Vigness, A.S.M.E., October Meeting, 1942, Preprints of Papers.)
397	5610	Germany ...	*Second Order Elastic Theory (with Examples).* (M. A. Biot, Z.A.A.M., Vol. 20, No. 2, April, 1940, pp. 89-90.)
398	5611	Germany ...	*Note on theBending of Thin Uniform Loaded Plate Bounded by Cardioids, Lemniscates and Certain Other Quarter Curves.* (B. Sen, Z.A.A.M., Vol. 20, No. 2, April, 1940, pp. 99-103.)
399	5613	Germany ...	*The Transformation of Certain Elastic Problems with Rotary Symmetry into the Corresponding Two-Dimensional Form and vice-versa.* (C. Weber, Z.A.A.M., Vol. 20, No. 2, April, 1940, pp. 117-118.)
400	5614	Germany ...	*First Variation of the Work of Deformation of Flat Plates Undergoing Buckling.* (W. Willers, Z.A.A.M., Vol. 20, No. 2, April, 1940, pp. 118-121.)
401	5618	Germany ...	*Stress Distribution in a Semiplane Fitted with Notch Bounded by a Circular Arc.* (C. Weber, Z.A.M.M., Vol. 20, No. 5, Oct., 1940, pp. 262-270.)
402	5619	Japan ...	*Stress Distribution in a Semi-Infinite Domain having a Plane Boundary and Compressed by a Rigid Body.* (H. Okubo, Z.A.M.M., Vol. 20, No. 5, Oct., 1940, pp. 271-276.)
403	5629	Germany ...	*Conversion Table for Brinell, Vickers and Rockwell Hardness Factors with Allowance for Experimental Scatter.* (Z.V.D.I., Vol. 86, No. 41-42, 17/10/42, pp. 621-622.)
404	5631	Germany ...	*Replacement of Rubber by Plastic (Polyvinyl Chloride) for Electric Cable Insulations.* (H. Beck, Z.V.D.I., Vol. 86, No. 41-42, 17/10/42, pp. 629-632.)
405	5633	Germany ...	*Natural Frequency of Elastically Mounted Mechanisms.* (K. Gruben, Z.V.D.I., Vol. 86, No. 41-42, 17/10/42, pp. 633-637.)
406	5634	Germany ...	*The Strength of Gear Wheels Made of Laminated Plastics.* (Z.V.D.I., Vol. 86, No. 41-42, 17/10/42, p. 638.)
407	5641	U.S.A. ...	*A Practical Method of Allowance for Shear Lag.* (J. S. Coutinho, J. Aeron. Sci., Vol. 9, No. 12, Oct., 1942, pp. 471-477.)
408	5650	G.B.	*Stresses on Studs.* (W. Ker Wilson, Aeroplane, Vol. 63, No. 1,642, 13/11/42, p. 577.)

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409	5653	G.B.	...	*Hardening of High Speed Tool Steel.* (S. F. Barclay, Engineer, Vol. 174, No. 4,531, 13/11/42, pp. 400-401.)
410	5663	G.B.	...	*Plastics (Abstracts of Literature issued by Controller of Chemical Research).* (Nos. 29-36 inclusive, Jan.-Aug., 1942.)
411	5664	G.B.	...	*Plastics (Abstracts of Literature issued by Controller of Chemical Research).* (No. 38, October, 1942.)
412	5698	G.B.	...	*The Practice of Powder Metallurgy (Pressing).* (H. W. Greenwood, Metal Industry, Vol. 61, No. 17, 23/10/42, pp. 265-267.)
413	5699	G.B.	...	*Industrial Uses of Selenium and Tellurium.* (G. R. Waitkins and others, Metal Industry, Vol. 61, No. 17, 23/10/42, pp. 267-268.)
414	5700	G.B.	...	*The Detection of Flaws (Eddy Current Pattern).* (Metal Industry, Vol. 61, No. 17, 23/10/42, p. 268.)
415	5706	G.B.	...	*Industrial Diamond Wire-Drawing Die.* (B. P. Dudding and others, Metal Industry, Vol. 61, No. 19, 6/11/42, pp. 290-293.)
416	5724	G.B.	...	*Protective Measures for Al. Equipment.* (H. J. Faheney and R. B. Mears, Metal Industry, Vol. 61, No. 19, 6/11/42.)
417	5725	U.S.A.	...	*The "Cherry" Blind Spot Rivet.* (Metal Industry, Vol. 61, No. 19, 6/11/42, p. 298.)
418	5732	U.S.A.	...	*Strength Characteristics of Plastic Bonded Plywood.* (G. B. Parsons, Aero Digest, Vol. 41, No. 2, Aug., 1942, pp. 140 and 218.)
419	5733	U.S.A.	...	*Northern Tropical America as a Source for Rubber.* (S. S. Kogut, Aero Digest, Vol. 41, No. 2, Aug., 1942, pp. 147-150 and 340-343.)
420	5739	G.B.	...	*Precision Pipe Bending (from the British).* Aero Digest, Vol. 41, No. 2, Aug., 1942, pp. 162-167 and 185.)
421	5741	U.S.A.	...	*Low Temperature Welding with Eutectic Alloys.* (Aero Digest, Vol. 41, No. 2, Aug., 1942, pp. 182 and 217.)
422	5752	Germany	...	*Processing Igelit Resin.* (Ind. and Eng. Chem. (News Ed.), Vol. 20, No. 18, 25/9/42, p. 1,176.)
423	5756	G.B.	...	*Elastic Wave and Vibration of Thin Rods.* (S. Prescott, Phil. Mag., Vol. 33, No. 225, Oct., 1942, pp. 703-754.)
424	5749	G.B.	...	*Natural and Synthetic Rubber.* (W. C. Geer, Chem. and Ind., Vol. 61, No. 44, 31/10/42, pp. 445-447.)
425	5760	G.B.	...	*Forging of Al. Alloys.* (H. Chase, Machinist, Vol. 86, No. 26, 10/10/42, pp. 644-647.)
426	5762	G.B.	...	*Beryllium Copper Springs.* (Metal Industry, Vol. 61, No. 18, 30/10/42, p. 278.)
427	5771	U.S.A.	...	*Hard Form of Synthetic Rubber (Ameripol).* (Scientific American, Vol. 167, No. 4, Oct., 1942, p. 155.)
428	5777	U.S.A.	...	*Glass Made without Silica.* (Scientific American, Vol. 167, No. 4, Oct., 1942, p. 169.)

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429	5778	U.S.A.	...	*Collapsible Barrel (Plywood Staves).* (Scientific American, Vol. 167, No. 4, Oct., 1942, p. 172.)
430	5786	G.B. ...	...	*Mechanical Gearing for Ships.* (Engineering, Vol. 154, No. 4,008, 6/11/42, pp. 378-380.)
431	5787	G.B. ...	...	*Evaluation of Corrosion Damage by Fatigue Tests.* (Engineering, Vol. 154, No. 4,008, 6/11/42, p. 380.)
432	5790	G.B. ...	...	*Flame Hardening.* (Engineer, Vol. 174, No. 4,530, 6/11/42, p. 385.)
433	5794	G.B. ...	...	*Stresses in Gear Tooth Fillets (Photo-Elastic Studies).* (Mech. World, Vol. 112, No. 2,912, 23/10/42, pp. 385-386.)
434	5795	G.B. ...	...	*Design of Volute Springs.* (Mech. World, Vol. 112, No. 2,912, 23/10/42, pp. 392-393.)
435	5797	Germany	...	*The Influence of Subsequent Treatment on the Properties of Steel Wire (Tempering and Timing).* (W. Pungel, Stahl und Eisen, Vol. 62, No. 42, 15/10/42, pp. 876-881.)
436	5799	G.B. ...	...	*Junctions in Al. Cables.* (Light Metals, Vol. 5, No. 57, Oct., 1942, pp. 388-395.)
437	5800	G.B. ...	...	*Design and Construction of Light Alloy Taps.* (Light Metals, Vol. 5, No. 57, Oct., 1942, pp. 400-402.)
438	5801	G.B. ...	...	*Intercrystalline Corrosion Controlled by Quenching Rate.* Light Metals, Vol. 5, No. 57, Oct., 1942, pp. 402-405.)
439	5802	G.B. ...	...	*Dies for Al. Sheet Metal Work.* (Light Metals, Vol. 5, No. 57, Oct., 1942, pp. 412-420.)
440	5803	G.B. ...	...	*Comparison of Al. Sheet and Tinplate for Canning.* (Light Metals, Vol. 5, No. 57, Oct., 1942, pp. 426-436.)
441	5820	G.B. ...	...	*The Ideal Inert Atmosphere (Helium and Argon).* (Light Metals, Vol. 5, No. 58, Nov., 1942, p. 439.)
442	5822	Switzerland	...	*Swiss Al. Industry Wartime Basis.* (Light Metals, Vol. 5, No. 58, Nov., 1942, pp. 443-445.)
443	5824	G.B. ...	...	*The Development of Light Alloy Gas Cylinders.* (Light Metals, Vol. 5, No. 58, Nov., 1942, pp. 448-455.)
444	5825	G.B. ...	...	*Light Alloy Arc Welding in Helium Atmospheres.* (Light Metals, Vol. 5, No. 58, Nov., 1942, pp. 456-459.)
445	5826	U.S.S.R.	...	*Melting Magnesium Under Hydrogen (from the Russian).* (Light Metals, Vol. 5, No. 58, Nov., 1942, pp. 460-463.)
446	5828	G.B. ...	...	*Alumina from Clay.* (Light Metals, Vol. 5, No. 58, Nov., 1942, p. 468.)
447	5830	G.B. ...	...	*Thermal Reduction of Magnesia.* (Light Metals, Vol. 5, No. 58, Nov., 1942, p. 469.)
448	5831	G.B. ...	...	*Al. in the Canning Industry.* (Light Metals, Vol. 5, No. 58, November, 1942, pp. 470-488.)
449	5861	G.B. ...	...	*Recent Plastic Developments (Bonding Metals).* (Flight, Vol. 42, No. 1,766, 29/10/42, pp. 475-477.)

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450	5866	G.B.	...	*Surface Protection of Al. Alloys* (*R.T.P. Translation No.* 1,463). (Airc. Prod., Vol. 4, No. 48, Oct., 1942, pp. 604-607.)
451	5877	U.S.A.	...	*Welding of Electron by the Heliarc Process* (*Shielding by Inert Helium*). (Flight, Vol. 42, No. 1,767, 5/11/42, p. 492.)
452	5907	U.S.A.	...	*New Developments in Synthetic Rubber.* (Autom. Ind., Vol. 87, No. 4, 15/8/42, pp. 26-29 and 74.)
453	5934	Germany	...	*The Wear of Plastic Gear Wheels.* (Z.V.D.I., Vol. 86, No. 41-42, 17/10/42, p. 638.)
				INSTRUMENTS.
454	*5300	Germany	...	*Stress Determinations and Investigations of Mechanical Vibration by Means of Electric Resistance Gauges of Strip or Ring Form.* (A. Theis, Zeitschr. and Techn. Phys., No. 11, 1941, pp. 273-280.)
455	5310	G.B.	...	*Bibliography of Published Information (including Translations) on Altimeters.* (R.T.P.3, Bibliography No. 64, Sept., 1942.)
456	5311	G.B.	...	*Bibliography of Published Information (including Translations) on Compasses* (1, *Radio Compass;* 2, *Magnetic Compass;* 3, *Gyroscopic Compass;* 4, *Solar Compass;* 5, *Compass Errors*). (R.T.P.3, Bibliography No. 63, Sept., 1942.)
457	5314	U.S.A.	...	*Portable Acoustic Plane Detector.* (Sci. Am., Vol. 166, No. 6, June, 1942, p. 271.)
458	5318	U.S.A.	...	*X-Ray Photographs of Armour-Piercing Bullets in Flight.* (Sci. Am., Vol. 166, No. 6, June, 1942, pp. 293-294.)
459	5343	U.S.A.	...	*Plastics in Sextant Construction.* (Modern Plastics, Vol. 19, No. 9, May, 1942, p. 39.)
460	5383	G.B.	...	*X-Ray Analysis* (*Defractions*). (Mech. World, Vol. 112, No. 2,907, 18/9/42, p. 265.)
461	5432	U.S.A.	...	*Portable X-Ray Unit for Field Tests* (*Photo*). (Autom. Ind., Vol. 87, No. 3, 1/8/42, p. 58.)
462	5433	U.S.A.	...	*Vibration Indicator Vibrometer* (*Electric Recording*). (Autom. Ind., Vol. 87, No. 3, 1/8/42, p. 90.)
463	5452	Germany	...	*Short Report on Publications on Measuring Instruments, with Special Reference to Practical Requirements.* (F. Neugebauer, Schriften Akad L.F.F., No. 5, 13/1/39, pp. 19-44.)
464	5458	Germany	...	*Acoustic Altimeter* (*Notes on Physical Design*). (H. Hecht, Schriften Akad L.F.F., Book 10, 10/2/39, pp. 1-26.)
465	5467	Germany	...	*Principles of Design and Performance of Variometers.* (A. Bestelmeyer, Schriften Akad L.F.F., No. 17, 7/7/39, pp. 1-29.)
466	5530	Germany	...	*Control Device for A.C. Generators for Aircraft Gyro Instruments* (*Pat. Series* 39, *No.* 723,830). (Ausschutz, Flugsport, Vol. 34, No. 21, 14/10/42, p. 159.)

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467	5570	Switzerland ...	*The Nature and Determination of Errors in Stereoscopic Range Finders.* (H. Donatsch, Flugwehr und Technik, Vol. 4, No. 10, Oct., 1942, pp. 262-268.)
468	5574	G.B.	*Testing Machine for Aeroplane Automatic Pilot.* (Engineering, Vol. 154, No. 4,009, 13/11/42, pp. 385-386.)
469	*5622	Germany ...	*The Measurement of Large Radii of Curvature (Very Flat Curves).* (K. Katterbach, Z.A.M.M., Vol. 20, No. 5, Oct., 1940, pp. 287-290.)
470	5625	Switzerland ...	*Nature and Determination of Errors when Evaluating Distances with the Stereoscopic Range Finder.* (H. Donatsch, Flugwehr und Technik, Vol. 4, No. 9, Sept., 1942, pp. 230-235.)
471	5638	U.S.A. ...	*Note on the Photographic Space-Time Recorder.* (E. S. Jenkins, J. Aeron. Sci., Vol. 9, No. 12, Oct., 1942, p. 456.)
472	5645	U.S.A. ...	*Present State of the Art and Science of Mechanism (Discussion).* (Mech. Eng., Vol. 64, No. 10, Oct., 1942, pp. 744-751.)
473	5754	G.B.	*Clock Controlled Governor for Close Speed Control (Discussion).* (J. Inst. Elect. Engs., Vol. 89, Pt. II, No. 11, Oct., 1942, p. 520.)
474	5755	U.S.A. ...	*A New System of Celestial Navigation.* (A. D'Aura, J. Aeron. Sci. (Rev. Sect.), Vol. 1, No. 7, Oct., 1942, pp. 11-15.)
475	5757	G.B.	*Electric Determination of Film Volume and Film Density.* (H. Lowy, Phil. Mag., Vol. 33, No. 225, Oct., 1942, pp. 772-774.)
476	5761	G.B.	*A Clock Controlled Governor for Close Speed Regulation.* (J. C. Prescott and M. N. Karaosman, J. Inst. Elect. Engs., Vol. 89, Part I, No. 21, Sept., 1942, pp. 440-441.)
477	5770	U.S.A. ...	*Instrument Bearings Made of Glass.* (Scientific American, Vol. 167, No. 4, Oct., 1942, p. 155.)
478	5785	G.B.	*Hot Air Hand Drier.* (Engineering, Vol. 154, No. 4,008, 6/11/42, p. 370.)
479	5798	Germany ...	*Balance for the Rapid Determination of the Degree of Magnetic Saturation of Ferro Magnetic Materials.* (H. Franssen, Stahl und Eisen, Vol. 62, No. 42, 15/10/42, pp. 887-888.)
480	5841	G.B.	*Square Ruled Paper Projection.* (C. V. Boys, J. Scientific Instruments, Vol. 19, No. 5, May, 1942, pp. 65-71.)
481	5842	G.B.	*The Point Discharge Recording Micro-Ammeter.* (J. L. Candler, J. Scientific Instruments, Vol. 19, No. 5, May, 1942, pp. 75-78.)
482	5843	G.B.	*A Device for Winding Small Toroidal Inductances.* (C. A. A. Wass, J. Scientific Instruments, Vol. 19, No. 5, May, 1942, pp. 78-79.)
483	5844	G.B.	*Cleaning Fine Copper Wire.* (D. Bell, J. Scientific Instruments, Vol. 19, No. 5, May, 1942, p. 79.)

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484	5845	G.B.	...	*A Device for the Continuous Indication of Oxygen Saturation of Circulating Blood in Man.* (E. A. G. Goldie, J. Scientific Instruments, Vol. 19, No. 2, Feb., 1942, pp. 23-25.)
485	5846	G.B.	...	*A Geared Photometer Turntable Suitable for Surfaces of Low Gloss.* (W. F. Barkas, J. Scientific Instruments, Vol. 19, No. 2, Feb., 1942, pp. 26-29.)
486	5852	G.B.	...	*A Rapid Method of Accurately Measuring Small Elongations of Tensile Test Bars.* (G. J. Thomas, J. Scientific Instruments, Vol. 19, No. 3, March, 1942, p. 45.)
487	5853	G.B.	...	*Flux for Soldering Phosphor Bronze Hair Springs.* (C. E. Homer and H. A. Watkins, J. Scientific Instruments, Vol. 19, No. 3, March, 1942, p. 45.)
				PRODUCTION.
488	5301	G.B.	...	*Bibliography of Published Information (including Translations) on Cutting Tools, with Special Reference to Cemented Carbide Tools.* (R.T.P.3, Bibliography No. 73, Oct., 1942.)
489	5302	G.B.	...	*Bibliography of Published Information on Cutting Fluids and Cutting Oils.* (R.T.P.3, Bibliography No. 72, Oct., 1942.)
490	5317	U.S.A.	...	*Cellophane Bags for Storing Spares.* (Sci. Am., Vol. 166, No. 6, June, 1942, pp. 289-290.)
491	5319	U.S.A.	...	*Sheet Metal Assembly Under Tension (Lindsay Structure).* (Sci. Am., Vol. 166, No. 6, June, 1942, p. 294.)
492	5378	G.B.	...	*The Physicist in the Factory.* (Engineering, Vol. 154, No. 4,006, 23/10/42, p. 332.)
493	5384	U.S.A.	...	*Assembly of Boeing Flying Fortress.* (Mech. World, Vol. 112, No. 2,907, 18/9/42, pp. 266-267.)
494	5389	Germany	...	*Foreign Labour in Germany.* (P. Osthold, W.T.M., No. 46, No. 8, Aug., 1942, pp. 181-184.)
495	5390	Germany	...	*The Mass Production of Armament.* (I. Brommer, W.T.M., Vol. 46, No. 8, Aug., 1942, pp. 185-191.)
496	5468	Germany	...	*Material Testing—the Concept of the Normal Sample with Note on Statistics.* (H. Daeves, Schriften Akad L.F.F., No. 19, 21/6/40, pp. 1-21.)
497	5500	Germany	...	*Junkers Rivet Sorting Machine.* (Flugsport, Vol. 34, No. 20, 30/9/42, p. 303.)
498	5501	Germany	...	*Some Examples of Dornier Test Apparatus (Spring Dynamometer, Extensometer, Torque Recording Spanner, etc.).* (Flugsport, Vol. 34, No. 20, 30/9/42, pp. 303-305.)
499	5521	Canada	...	*Work of Ministry of Aircraft Production (Organisation, British Aircraft, American Aircraft, Engine Production, Armament Research and Development, Salvage).* (Various authors, Flying and Popular Aviation, Vol. 31, No. 3, Sept., 1942. pp. 157-169 and 172.)

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500	5541	Germany ...	*Reorganisation of German Armament Industry.* (Inter. Avia., No. 839-840, 19/10/42, p. 23.)
501	5584	Germany ...	*Periodic Rise in Al. Foundry Rejects Traced to Accumulation of Remelted Metal.* (P. Schwerber, Aluminium, Vol. 24 ,No. 10, Oct., 1942, pp. 337-341.)
502	5607	U.S.A. ...	*What Can be Done to Train Women for Engineering Jobs.* (R. H. Baker and O. S. Reinold, A.S.M.E., October Meeting, 1942, Preprints of Papers.)
503	5628	Germany ...	*The Role of the Designer for Increased Production.* (F. Resselring and I Sihler, Z.V.D.I., Vol. 86, No. 41-42, 17/10/42, pp. 617-621.)
504	5632	Germany ...	*Speeding Up Production by Rapid Methods of Supplying and Withdrawing Goods to the Machine Tools.* (Z.V.D.I., Vol. 86, No. 41-42, 17/10/42, p. 632.)
505	5643	U.S.A. ...	*Development of Standards for Army Ordnance Finishes.* (M. R. Norton, Mech. Eng., Vol. 64, No. 10, Oct., 1942, pp. 703-717.)
506	5646	G.B.	*Weight per Foot Run of Circular and Hexagon Wires.* (Hutte, Vol. 1, p. 815.)
507	5665	U.S.A. ...	*The Effects of Exposure to Toluene in Industry.* (L. Greenburg and others, J. Amer. Med. Ass., Vol. 118, No. 8, Feb. 21, 1942, pp. 573-578. Abstract, Bulletin of War Medicine, Vol. 3, No. 2, Oct., 1942, p. 111.)
508	5666	U.S.A. ...	*The Toxicity and Potential Dangers of Toluene. Preliminary Report.* (W. F. von Oettingen and others, J. Amer. Med. Ass., Vol. 118, No. 8, Feb. 21, 1942, pp. 579-584. Abstract, Bulletin of War Medicine, Vol. 3, No. 2, Oct., 1942, pp. 111-112.)
509	5667	G.B.	*Porphyrinuria in Trinitrotoluene Poisoning.* (A. M. Kennedy and J. Ingham, Brit. Med. J., April 18, 1942, pp. 490-492. Abstract, Bulletin of War Medicine, Vol. 3, No. 2, Oct., 1942, p. 112.)
510	5668	Canada ...	*New Kind of Gas Gangrene if Magnesium Enters Wounds.* (Bulletin, Brit. Columbia Board of Health, March, 1942, Vol. 12, No. 3, pp. 33-34. Abstract, Bulletin of War Medicine, Vol. 3, No. 2, Oct., 1942, p. 112.)
511	5673	G.B.	*Health of the War Worker.* (Labour Research Dept., A Handbook prepared in co-operation with the Socialist Medical Association, 40 pp., April, 1942. London, 6, High Holborn, price 6d.) (Abstract, Bulletin of War Medicine, Vol. 3, No. 2, Oct., 1942, p. 111.)
512	5678	Australia ...	*Industrial Fatigue.* (H. M. L. Murray, Med. J., Australia, Oct. 18th, 1941, Vol. 2, No. 16, pp. 437-441. Abstract in Bulletin of War Medicine, Vol. 3, No. 1, Sept., 1942, p. 51.)
513	5679	Australia ...	*Industrial Fatigue and Australia's War Effort.* (Med. J., Australia, Oct. 18th, 1941, Vol. 2, No. 16, pp. 455-456. Abstract in Bulletin of War Medicine, Vol. 3, No. 1, Sept., 1942, p. 51.)

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514	5680	Germany	...	*Symposium on Fatigue and Measures of Combating Fatigue.* (Various authors, Abstract, Bulletin of War Medicine, Vol. 3, No. 1, Sept., 1942.)
515	5681	G.B. ...	...	*Lighting Large Factory Areas with Fluorescent Lamps.* (C. J. Taylor, Illuminating Engineering, Dec., 1941, Vol. 36, No. 10, pp. 1,414-1,436. Abstract, Bulletin of War Medicine, Vol. 3, No. 1, Sept., 1942, p. 51.)
516	5695	G.B. ...	...	*Dry Machining of Mg. Alloys.* (H. M. Garner, Metal Industry, Vol. 61, No. 17, 23/10/42, pp. 258-259.)
517	5696	G.B. ...	...	*Limits of Composition and Impurities.* (J. N. Bradley and H. O'Neill, Metal Industry, Vol. 61, No. 17, 23/10/41, pp. 260-261.)
518	5697	G.B. ...	...	*"Purging" Controlled Atmosphere Furnaces* (F. B. Leslie, Metal Industry, Vol. 61, No. 17, 23/10/42, pp. 262-264.)
519	*5723	G.B. ...	...	*Rapid Identification of Non-Ferrous Scrap.* (Metal Industry, Vol. 61, No. 19, 6/11/42, pp. 294-295.)
520	5728	U.S.A.	...	*Fighting Incendiary Fires in Aircraft Plants.* (Aero Digest, Vol. 41, No. 2, Aug., 1942, pp. 102-104 and 241-242.)
521	5731	U.S.A.	...	*Method of Development for Tapered Wings.* (P. Antry, Aero Digest, Vol. 41, No. 2, Aug., 1942, pp. 136-139.)
522	5736	U.S.A.	...	*Carbide Cutters on Large Machine Tools.* (F. W. Lucht, Aero Digest, Vol. 41, No. 2, Aug., 1942, pp. 156 and 191.)
523	5737	U.S.A.	...	*Plant Production Aided by Interchanges of Plant Personnel and Facilities.* (Aero Digest, Vol. 41, No. 2, Aug., 1942, pp. 78 and 247-248.)
524	5742	U.S.A.	...	*Cleaning and Repacking Ball and Roller Bearings.* (P. Montgomery, Aero Digest, Vol. 41, No. 2, pp. 186-187.)
525	5745	U.S.A.	...	*Handling Equipment for Speeding Aircraft Production.* (L. V. Spenser, Aero Digest, Vol. 41, No. 2, Aug., 1942, pp. 197-198 and 201-213 and 335-339.)
526	5750	U.S.A.	...	*Technique and Application of Industrial Microradiography.* (G. L. Clark and S. T. Gross, Ind. and Eng. Chem. (Anal. Ed.), Vol. 14, No. 8, 17/8/42, pp. 676-683.)
527	5763	G.B. ...	...	*Scrap Salvage Problems.* (H. W. Greenwood, Vol. 61, No. 18, 30/10/42, pp. 379-381.)
528	5769	U.S.A.	...	*U.S.A. War Factories Built of Wood and Concrete.* (Scientific American, Vol. 167, No. 4, Oct., 1942, p. 154.)
529	5772	U.S.A.	...	*Increased Use of Silver in Electrical Equipment.* (Scientific American, Vol. 167, No. 4, Oct., 1942, p. 155.)
530	5773	U.S.A.	...	*Freezing of Machine Tool Parts and Sub-Zero Tempering of Tool Steels.* (Scientific American, Vol. 167, No. 4, Oct., 1942, p. 156.)

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531	5779	G.B.	... ...	*The Minister of Production on a New Policy.* (Engineer, Vol. 174, No. 4,529, 30/10/42, pp. 354-355.)
532	5783	G.B.	... ...	*Stitching Machine for Metals.* (Engineering, Vol. 154, No. 4,008, 6/11/42, p. 366.)
533	5792	G.B.	... ...	*Electric Arc Furnace.* (A. G. Robiette, Engineer, Vol. 174, No. 4,530, 6/11/42, p. 381.)
534	5793	G.B.	... ...	*Statistical Quality Control.* (B. P. Dudding and W. J. Jennet, Mech. World, Vol. 112, No. 2,912, 23/10/42, p. 383.)
535	5796	U.S.A.	...	*Conveyor Assembly of Aircraft Parts (Douglas Co.).* (Mech. World, Vol. 112, No. 2,912, 23/10/42, p. 399.)
536	5821	G.B.	... ...	*Storage of Light Alloys.* (Light Metals, Vol. 5, No. 58, Nov., 1942, pp. 440-442.)
537	5827	Germany	...	*Mass Production of Aircraft in the Junkers Concern (from the German).* (Light Metals, Vol. 5, No. 58, Nov., 1942, pp. 464-466.)
538	5829	G.B.	... ...	*Machining Mg. Alloys.* (Light Metals, Vol. 5, No. 58, Nov., 1942, p. 469.)
539	5850	G.B.	... ...	*Physics and Protection Against Industrial Dust.* (K. L. Goodall, J. Scientific Instruments, Vol. 19, No. 3, March, 1942, pp. 33-40.)
540	5862	G.B.	... ...	*Daylight in Factories (Removable Black-Out).* (Airc. Production, Vol. 4, No. 48, Oct., 1942, pp. 583-585.)
541	5863	U.S.A.	...	*Line Assembly of Liberators.* (Airc. Prod., Vol. 4, No. 48, Oct., 1942, pp. 586-590.)
542	5863	G.B.	... ...	*Welding Developments (Goggles, Air-Cooled Torch, Rotary Work Tables).* (Airc. Prod., Vol. 4, No. 48, Oct., 1942, p. 591.)
543	5867	U.S.A.	...	*Inspection Methods of the Lockheed Aircraft Co.* (Airc. Prod., Vol. 4, No. 48, Oct., 1942, p. 607.)
544	5868	G.B.	... ...	*Taylor-Hobson Optical Sections Projector for the Examination of Gears, Splines, etc.).* (Airc. Prod., Vol. 4, No. 48, Oct., 1942, pp. 610-611.)
545	5869	U.S.A.	...	*Weight Prediction and Control in American Practice.* (Airc. Prod., Vol. 4, No. 48, Oct., 1942, pp. 624-662.)
546	5870	G.B.	... ...	*Fluorescent Crack Detection.* (Airc. Prod., Vol. 4, No. 48, Oct., 1942, p. 611.)
547	5871	G.B.	... ...	*Wire Stitching for Non-Structional Parts.* (Airc. Prod., Vol. 4, No. 48, Oct., 1942, pp. 612-613.)
548	5872	G.B.	... ...	*A New Template Emulsion for Application to Metal, Wood or Fabric.* (Airc. Prod., Vol. 4, No. 48, Oct., 1942, p. 615.)
549	5873	G.B.	... ...	*Machining Cylinder Barrels (British, German and American Practice).* (Airc. Prod., Vol. 4, No. 48, Oct., 1942, p. 626.)
550	5874	G.B.	... ...	*Photographic Equipment for Transferring Loft Layouts (Glenn Martin).* (Airc. Prod., Vol. 4, No. 48, Oct., 1942, pp. 629-630.)
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553	5909	U.S.A.	...	*Tooling for Plastic Bonded Aircraft.* (W. D. Lewis, Autom. Ind., Vol. 87, No. 4, 15/8/42, pp. 32-34 and 68-70.)
554	5919	Germany	...	*Jigs for Aircraft Assembly Lines* (*Pat. Series 41, No. 725,524*). (Junkers, Flugsport, Vol. 34, No. 23, 11/11/42, p. 166.)
555	5926	U.S.S.R.	...	*Mineral Resources of the U.S.S.R.* (D. Williams, Nature, Vol. 150, No. 3,810, 7/11/42, pp. 539-541.)
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556	5425	U.S.A.	...	*Acetylene Generators for Motor Car* (*Used in Conjunction with Methyl Alcohol or Ammonia*). (Autom. Ind., Vol. 87, No. 3, 1/8/42, pp. 20 and 72.)
557	5430	U.S.A.	...	*M-4 All-Welded Tanks.* (Autom. Ind., Vol. 87, No. 3, 1/8/42, pp. 46-47.)
558	5497	U.S.A.	...	*Truck Maintenance as a High Road to Victory.* (W. J. Cumming, S.A.E. Preprints, Transport Meeting, New York, Oct. 7-8, 1942.)
559	5652	G.B. ...	...	*Practical Road Transport Operation with Producer Gas.* (J. E. Birchall, Engineer, Vol. 174, No. 4,531, 13/11/42, pp. 392-394.)
560	5774	U.S.A.	...	*Welding V. Riveting in Armoured Vehicles.* (Scientific American, Vol. 167, No. 4, Oct., 1942, p. 156.)
561	5885	U.S.S.R.	...	*Russian Mechanised Units on the Eastern Front* (*German Photograph*). (Autom. Ind., Vol. 87, No. 1, 1/7/42, pp. 28-29.)
562	5894	U.S.S.R.	...	*Russian Tanks.* (W.T.M., Vol. 46, No. 9, Sept., 1942, pp. 205-211.)
563	5895	Italy ...	...	*Notes on Italian Tanks.* (H. Bougartz, W.T.M., Vol. 46, No. 9, Sept., 1942, pp. 211-215.)
				SOUND, LIGHT AND HEAT.
564	5347	U.S.A.	...	*Diffusion of Light by Plastics* (*Methods of Testing*). (Modern Plastics, Vol. 19, No. 9, May, 1942, pp. 68-69, and 102.)
565	5447	Germany	...	*The Lowest Temperatures Reached To-day.* (P. Debye, Schriften Akad L.F.F., No. 3, 18/2/38, pp. 1-7.)
566	5456	Germany	...	*Some New Experiments in Optics.* (R. W. Pohl, Schriften Akad L.F.F., No. 8, 18/2/38, pp. 1-14.)
567	5459	Germany	...	*Short Report on Acoustics Research.* (R. W. Pohl, Schriften Akad L.F.F., No. 10, 10/2/39, pp 27-31.)
568	5460	Germany	...	*New Optical Methods for Investigation of the Radiation Field of Acoustic Generators.* (E. Hiedmann, Schriften Akad L.F.F., No. 10, 10/2/39, pp. 33-38.)

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570	5606	U.S.A.	...	*Effects of Wood Structure upon Heat Conductivity.* (F. F. Wangaard, A.S.M.E., October Meeting, 1942, Preprints of Papers.)
571	5644	U.S.A.	...	*Twenty Years Progress in Domestic Oil Heating.* (R. J. Bender, Mech. Eng., Vol. 64, No. 10, Oct., 1942, pp. 731-740.)
572	5753	G.B. ...	...	*Fluorescent Lamps (with Discussion).* (L. J. Davies and others, J. Inst. Elect. Engs., Vol. 89, Pt. 2, No. 11, Oct., 1942, pp. 447-472.)
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574	5765	U.S.A.	...	*Infra Red Radiant Heating.* (F. M. Tiller and H. J. Garber, Ind. and Eng. Chem. (Ind. Chem.), Vol. 34, No. 7, July, 1942, pp. 773-781.)
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576	5768	U.S.A.	...	*Temperatures in Solids During Heating and Cooling of Standard Shapes (Tables for Numerical Solutions for a Number of Standard Shapes).* (F. C. W. Olson and O. T. Schultz, Ind. and Eng. Chem. (Ind. Ed.), Vol. 34, No. 7, July, 1942, pp. 874-877.)
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578	5312	G.B. ...	...	*Theory of X-Ray Diffraction.* (P. P. Ewald, Nature, Vol. 150, No. 3,807, 17/10/42, pp. 450-451.)
579	5313	G.B. ...	...	*Determination of Equilibrium Diagrams by X-Ray Methods.* (Nature, Vol. 150, No. 3,807, 17/10/42, pp. 465-467.)
580	5382	G.B. ...	...	*Overheating in Electric Motors.* (Mech. World, Vol. 112, No. 2,907, 18/9/42, pp. 263-265.)
581	5434	G.B. ...	...	*The Electric Spark in Air.* (J. M. Meek, J. Inst. Elec. Engs., Vol. 89, Pt. 1, No. 20, Aug., 1942, pp. 335-356.)
582	5435	G.B. ...	...	*Discussion on Metal Rectifiers.* (J. Inst. Elect. Eng., Vol. 89, Pt. 1, No. 20, Aug., 1942, pp. 357-362.)
583	5436	G.B. ...	...	*The Technique of Frequency Measurement and its Application to Telecommunication.* (J. E. Thwaites and F. J. M. Laver, J. Inst. Elect. Engs., Vol. 89, Pt. 1, No. 20, Aug., 1942, pp. 370-372.)
584	5437		... ...	*Field Measurements of Insulation.* (E. A. Burton and others, J. Inst. Elect. Engs., Vol. 89, Pt. II, No. 10, Aug., 1942, pp. 288-316.)

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585	5439	G.B.	...	*Characteristics and Application of the Selenium Rectifier.* (J. Inst. Elect. Engs., Vol. 89, Pt. II, No. 20, Aug., 1942, pp. 371-372.)
586	5454	Germany	...	*The Aims and Results of Several Years' Research on the Ionosphere.* (H. Plendl, Schriften Akad L.F.F., No. 6, 27/1/39, pp. 29-91.)
587	5496	G.B.	...	*Abstracts and References Issued by the Wireless Engineer.* (Nov., 1942.)
588	5588	Germany	...	*Electrical Contact Resistance Between Copper and Cladded Aluminium.* (H. Raabe, Aluminium, Vol. 24, No. 10, Oct., 1942, pp. 358-360.)
589	5692	Germany	...	*Mechanised Design of German Army Wireless Components.* (D. Gifford Hull, Electronic Engineering, Vol. 14, No. 177, Nov., 1942, pp. 238-240.)
590	5693	G.B.	...	*Some Data on Recent R.C.A. Valves.* (Electronic Engineering, Vol. 14, No. 177, Nov., 1942, pp. 254-255.)
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594	5804	G.B.	...	*Radiation Energy and Earth Absorption for Dipole Antennæ.* (A. Sommerfeld and F. Renner, Wireless Engineer, Vol. 19, No. 229, Oct., 1942, pp. 457-462.)
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596	5847	G.B.	...	*Electrical Contacts for Instruments.* (J. C. Chaston, J. Scientific Instruments, Vol. 19, No. 4, April, 1942, pp. 50-53.)
597	5848	G.B.	...	*The Measurement of Capacity and Inductance of Concentric Cables at High Frequencies.* (F. Jones, J. Scientific Instruments, Vol. 19, No. 4, April, 1942, pp. 53-58.)
598	5849	G.B.	...	*A Note on the Stability of Liquid High Resistances.* (J. D. Craggs, J. Scientific Instruments, Vol. 19, No. 4, April, 1942, p. 62.)
599	5851	G.B.	...	*Note on the Preparation and Properties of Metal-Coated Mica Condensers.* (J. D. Craggs, J. Scientific Instruments, Vol. 19, No. 3, March, 1942, pp. 40-43.)
600	5875	G.B.	...	*The Technique of Frequency Measurement and its Application to Telecommunications.* (J. E. Thwaites and F. J. M. Laver, J. Inst. Elect. Engs., Vol. 89, Part III, No. 7, Sept., 1942, pp. 139-167.)

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601	5876	G.B. ...	...	*The Characteristics and Applications of the Selenium Rectifier (Discussion).* (J. Inst. Elect. Engs., Vol. 89, Part III, No. 7, Sept., 1942, pp. 176-177.)
				METEOROLOGY AND PHYSIOLOGY.
602	5327	G.B. ...	...	*Exhaust Contamination of Cockpit.* (D. C. Greenwood, Flight, Vol. 42, No. 1,763, 8/10/42, pp. 397-399.)
603	5348	G.B. ...	...	*Vapour Trails of Beaufighter at 300 m.p.h. (Photo).* (Aeroplane, Vol. 63, No. 1,636, 2/10/42, pp. 382 and 408.)
604	5461	Germany	...	*Determination of Oxygen by a Physical Method (Magnetic Susceptibilities).* (H. Rein, Schriften Akad L.F.F., No. 11, 1/6/39, pp. 1-7.)
605	5463	Germany	...	*Biological Problems of High Speed Flight.* (S. Ruff, Schriften Akad L.F.F., No. 13, 28/4/39, pp. 1-21.)
606	5469	Germany	...	*Meteorology Applied to Navigation.* (H. Seilkopf, Schriften Akad L.F.F., No. 21, 30/8/40, pp. 1-40.)
607	5475	Germany	...	*On the Present State of Research on High Altitude Breathing.* (H. Rein, Schriften Akad L.F.F., No. 28, 20/5/38, pp. 1-19.)
608	5476	Germany	...	*Photographic Evidence of Physiological Height Effects on Pilots (Cinema Film).* (H. Strughold, Schriften Akad L.F.F., No. 28, 20/5/38, pp. 21-24.)
609	5477	Germany	...	*Some High Altitude Flying Accidents of Recent Years Caused by Failure of the Human Organism.*
610	5483	Germany	...	*The Importance of Carbon Dioxide Breathing at High Altitudes.* (H. Rein, Schriften Akad L.F.F., No. 32, 17/1/41, pp. 3-10.)
611	5484	...	...	*Altitude Sickness Caused by Drop in Pressure.* (T. Benzinger and W. Hornberger, Schriften Akad L.F.F., No. 34, 25/4/41, pp. 1-42.)
612	5486	Germany	...	*Pilot Balloon of High Rate of Ascent and Recording Thermometer of Small Lag.* (E. Regener, Schriften Akad L.F.F., No. 37, 17/1/41, pp. 5-13.)
613	5487	Germany	...	*Experiments on Condensation and Sublimation of Water Vapour at Low Temperatures.* (E. Regener, Schriften Akad L.F.F., No. 37, 17/1/41, pp. 17-24.)
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619	5669	G.B.	*Rehabilitation in the Royal Air Force.* (R. Jones Watson, Brit. Med. J., March 28th, 1942, pp. 403-407. Abstract, Bulletin of War Medicine, Vol.3, No. 2, Oct., 1942, pp. 108-109.)
620	5670	Canada ...	*The Electro-Cardiographic Records of 2,000 R.C.A.F. Aircrew.* (G. E. Hall and others, Canadian Med. Ass. J., 1942, March, Vol. 46, No. 3, pp. 226-230. Abstract, Bulletin of War Medicine, Vol. 3, No. 2, Oct., 1942, p. 110.)
621	5671	U.S.A. ...	*Relation Between the Electro-Encephalogram and Flying Ability.* (M. Thorner and others, War Medicine, Chicago, March, 1942, Vol. 2, No. 2, pp. 255-262. Abstract in Bulletin of War Medicine, Vol. 3, No. 2, Oct., 1942, p. 110.)
622	5672	G.B.	*The Examination of Night Visual Capacity in Relation to Flying.* (P. C. Livingston, Brit. J. Surgery, Jan., 1942, Vol. 29, No. 29, No. 115, pp. 339-345. Abstract, Bulletin of War Medicine, Vol. 3, No. 2, Oct., 1942, pp. 110-111.)
623	5674	U.S.A. ...	*Toxicology of Acrylonitrile (Vinyl Cyanide). 1, A Study of the Acute Toxicity.* (H. C. Dudley and P. A. Neal, J. Indust. Hyg. and Toxicol., Feb., 1942, Vol. 24, No. 2, pp. 27-36. Abstract, Bulletin of War Medicine, Vol. 3, No. 1, Sept., 1942, pp. 53-54.)
624	5675	Germany ...	*Increase in Respiratory Volume Produced by Oxygen Deficiency in Persons Adapted to High Altitudes.* (E. Opitz, Verhandl. d. deut. Gesell. für Kreislaufforsch., 1940, Vol. 13, pp. 86-92. Abstract, Bulletin of War Medicine, Vol. 3, No. 1, Sept., 1942, pp. 44-45.)
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629	5684	Germany	...	*Effects of Highly Concentrated Oxygen on the Organism.* (H. Becker-Freyseng, Verhandl. d. deut. Gesellsch. f. Kreislaufforsch., 1940, Vol. 13, pp. 83-85. Abstract in Bulletin of War Medicine, Vol. 3, No. 1, Sept., 1942, p. 46.)
630	5685	U.S.A.	...	*Some Effects of Hyperventilation, with Special Reference to Aviation Medicine.* (F. R. Rushmer, Proc. Staff Meetings, Mayo Clinic, Dec. 17th, 1941, Vol. 16, No. 51, pp. 801-808. Abstract in Bulletin of War Medicine, Vol. 3, No. 1, Sept., 1942, pp. 46-47.)
631	5686	U.S.A.	...	*Fatigue in Aircraft Pilots.* (R. A. McFarland, New England J. of Med., Nov. 27, 1941, Vol. 225, No. 22, pp. 845-855. Abstract in Bulletin of War Medicine, Vol. 3, No. 1, Sept., 1942, p. 47.)
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642	*5701	U.S.A. ...	*Characteristics of Wide Angle Aircraft Camera Lenses (R.P. 1,498).* (F. E. Washer, J. Res. Bur. Stands., Vol. 29, No. 3, Sept., 1942, pp. 233-246.)
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643	5612	Germany ...	*The Numerical Integration of Ordinary Differential Equations of the Second and Higher Orders.* (R. Zurmühl, Z.A.A.M., Vol. 20, No. 2, April, 1940, pp. 104-116.)
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646	5394	G.B.	*Abstracts No. 910-949, Issued by the I.A.E. Automobile Research Committee, Aug.*, 1942.
647	5395	Germany ...	*Physikalische Berichte (Abstracts No. 1,533-1,612).* (Vol. 23, No. 16, 15/8/42.)
648	5396	Germany ...	*Physikalische Berichte (Abstracts No. 1,613-1,676).* (Vol. 23, No. 17, 1/9/42.)
649	5397	G.B.	*Rotol Digest.* (Vol. 3, No. 39, 30/9/42.)
650	5398	G.B.	*Rotol Digest.* (Vol. 3, No. 40, 7/10/42.)
651	5399	G.B.	*Rotol Digest.* (Vol. 3, No. 41, 14/10/42.)
652	5400	G.B.	*Rotol Digest.* (Vol. 3, No. 42, 21/10/42.)
653	5401	G.B.	*Austin Technical News.* (Vol. 1, No. 10, 30/9/42.)
654	5402	G.B.	*Austin Technical News.* (Vol. 1, No. 11, 7/10/42.)
655	5403	G.B.	*Austin Technical News.* (Vol. 1, No. 12, 14/10/42.)
656	5404	G.B.	*Austin Technical News.* (Vol. 1, No. 13, 21/10/42.)
657	5405	G.B.	*Austin Technical News.* (Vol. 1, No. 14, 28/10/42.)
658	5406	G.B.	*Technical Abstracts Issued by the Aero Engine Dept., Bristol Aeroplane Co.* (Vol. 7, No. 15, 8/10/42.)
659	5407	G.B.	*Technical Abstracts Issued by the Aero Engine Dept., Bristol Aeroplane Co.* (Vol. 7, No. 16, 15/10/42.)
660	5408	G.B.	*Technical Abstracts Issued by the Aero Engine Dept., Bristol Aeroplane Co.* (Vol. 7, No. 17, 22/10/42.)
661	5409	G.B.	*Technical Abstracts Issued by the Aero Engine Dept., Bristol Aeroplane Co.* (Vol. 7, No. 18, 29/10/42.)
662	5412	G.B.	*Technical Abstracts and Information Issued by Rolls Royce.* (Vol. 3, No. 10, Oct., 1942.)
663	5440	G.B.	*Rotol Digest.* (Vol. 3, No. 48, 27/10/42.)
664	5442	Germany ...	*Physikalische Berichte.* (Vol. 23, No. 18, 1942.)
665	5491	G.B.	*Austin Technical News.* (Vol. 1, No. 15, 4/11/42.)

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667	5495	G.B.	... ...	*Technical Abstracts Issued by the Aero Engine Dept., Bristol Aeroplane Company, Ltd.* (Vol. 7, No. 19, 5/11/42.)
668	5539	G.B.	... ...	*Austin Technical News.* (Vol. 1, No. 16, 11/11/42.)
669	5576	G.B.	... ...	*International System and Standards.* (Engineering, Vol. 154, No. 4,009, 13/11/42, p. 392.)
670	5577	G.B.	... ...	*Universal Decimal Classification.* (Engineering, Vol. 154, No. 4,009, 13/11/42, p. 393.)
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672	5655	Germany	...	*Physikalische Berichte.* (Vol. 23, No. 13, 1942.)
673	5656	G.B.	... ...	*Rolls Royce Abstracts.* (Vol. 3, No. 11, Nov., 1942.)
674	5658	G.B.	... ...	*Rotol Digest.* (Vol. 3, No. 45, 11/11/42.)
675	5659	G.B.	... ...	*Technical Abstracts Issued by the Aero Engine Det., Bristol Aeroplane Co.* (Vol. 7, No. 20, Nov. 12th, 1942.)
676	5888	G.B.	... ...	*Austin Technical News.* (Vol. 1, No. 17, 18/11/42.)
677	5889	G.B.	... ...	*Rotol Digest.* (Vol. 3, No. 46, 10/11/42.)
678	5890	G.B.	... ...	*Technical Abstracts Issued by the Aero Engine Dept., The Bristol Aeroplane Co.* (Vol. 7, No. 21, 19/11/42.)
679	5891	G.B.	... ...	*Austin Technical News.* (Vol. 1, No. 19, 26/11/42.)
680	5892	G.B.	... ...	*Fuel Research Intelligence Section.* (Summary for two weeks ending 7th and 14th November, 1942.)

ABSTRACTS FROM THE SCIENTIFIC AND TECHNICAL PRESS.

Issued by the

Directorates of Scientific Research and Technical Development, Air Ministry.

(Prepared by R.T.P.3.)

No. 108. JANUARY, 1943.

Notices and abstracts from the Scientific and Technical Press are prepared primarily for the information of Scientific and Technical Staffs. Particular attention is paid to the work carried out in foreign countries, on the assumption that the more accessible British work (for example that published by the Aeronautical Research Committee) is already known to these Staffs.

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NOTE.—As far as possible, the country of origin quoted in the items refers to the original source.

Some Definite Integrals Occurring in Aerodynamics. (H. Bateman, Kármán's Anniversary Volume Applied Mechanics, pp. 1-7.) (Reprint available.) (108/1 U.S.A.)

An integral used by Glauert in his numerical study of a wing in a free jet of circular section is evaluated in terms of the generalized hypergeometric function and is found to belong to a class of integrals involving the hypergeometric function that can be expressed in a similar way. A proof is given of Glauert's reciprocal relation.

The integrals used by Squire in his numerical work are derived in a new way and are found to belong to a class of integrals involving Legendre functions of the second kind.

On a Method for the Solution of Boundary-Value Problems. (R. Courant, Kármán's Anniversary Volume Applied Mechanics, pp. 189-194.) (Reprint available.) (108/2 U.S.A.)

Instead of the Rayleigh-Ritz method for variational problems another method, initiated by Hadamard, is considered, in which a function arbitrarily chosen at the start is continuously or stepwise corrected along the gradient of the functional to be minimized. The procedure converges to the desired solution in certain classes of problems which include problems of conformal mapping of simply—or multiply—connected domains.

On Lubrication Flow with Period Distribution Between Prescribed Boundaries. (H. Reissner, Kármán's Anniversary Volume of Applied Mechanics, pp. 310-316.) (Reprint available.) (108/3 U.S.A.)

The viscous flow in the narrow gap between a Michell wedge-shaped pad and the counter surface of a bearing has been treated approximately by the Reynolds equation of lubrication, and it has further been shown that a more exact theory leads to the same result in the limit for a very small wedge angle.

Yet a certain doubt remains about the question of the boundary conditions at the entrance and the exit of the flow, because pressure values prescribed at the ends of the gap have always been assumed for such conditions. But at both ends appreciable velocities and even an eddying motion are certainly produced, so that the pressures (or more exactly the principal stresses) cannot give the decisive condition.

This consideration has induced the author to investigate the flow over a periodic arrangement of wedge-shaped pads preferably following each other with continuous curvature. The other purpose for such an arrangement is to give a theory for a flow avoiding eddying spaces, as a preparation for attempts to improve the Michell bearing.

The Ideal Performance of Curved-Lattice Fans. (F. L. Wattendorf, Kármán's Anniversary Volume of Applied Mechanics, pp. 285-292.) (Reprint available.) (108/4 U.S.A.)

A curved-lattice fan is defined as a fan having curved blades with sufficiently close spacing to exert a predominant guiding action on the fluid. The present study analyzes the ideal case of perfect guiding in a frictionless flow. Simple expressions are developed for computing ideal pressure-quantity curves for fans of this type. The influence of factors such as pressure coefficient and hub ratio on the performance curves are studied separately.

Although the analysis is intended as being qualitative in nature, good agreement of the theory with experimental results on a fan of moderately high chord/spacing ratio gives hope of further useful application to practical fan problems.

On the Permissible Roughness in the Laminar Boundary Layer. (I. Tani, R. Hama and S. Mituisi, Rept. No. 199, Aero. Res. Inst., Tokyo, Oct., 1940, pp. 419-428.) (108/5 Japan.)

Experiments were carried out on the transition from laminar to turbulent flow in the boundary layer of a flat plate and a symmetrical aerofoil. The transition was initiated by a fine wire in contact with the surface and perpendicular to the flow and detected by the sudden change in total pressure of a small pitot in contact with the plate at some distance behind the wire. For small values of the thickness k of the excrescence, the shearing stress τ_0 for laminar flow is given by

$$\tau_0 = \mu\,(u_k/k)$$

where (Eng.) u_k = velocity of flow at top of excrescence.

Introducing the so-called friction velocity $v_F = (\tau_0/\rho)^{\frac{1}{2}}$, Goldstein has suggested that the critical value of k (*i.e.*, maximum permissible value before breakdown of laminar flow) is given by

$$\frac{kv_F}{\gamma} < 7$$

From the author's experiments, however, it appears that stability of the laminar layer is maintained provided

$$\frac{kv_F}{\mu} > 13 \text{ (flat plate)}$$

$$\text{or} > 15 \text{ (symmetrical aerofoil)}$$

Taking the lower value to be on the safe side the permissible roughness can be expressed in the form :—

$$\frac{k}{t} = \frac{13}{A}\left(\frac{Vt}{\gamma}\right)^{-3/4}$$

where t = chord

V = velocity of undisturbed flow

$$A = \frac{(Vt/\gamma)^{1/4}\,(\tau_0/\rho)^{1/2}}{V}$$

"A" will depend on shape of body as well as position of excrescence.

Experiments on Rows of Aerofoils Under Conditions of Retarded Flow. (Y. Shimoyama, Memoirs of the Faculty of Engineering, Imperial University, Japan, Vol. 8, No. 4, 1934, pp. 281-329.) (108/6 Japan.)

The experiments were carried out on grids of 5, 7 and 9 aerofoils respectively, placed at the end of a square nozzle of 53 cm. side in such a way that the incident air stream underwent a retardation, corresponding to an increase in pressure (axial flow compressor). The central aerofoil in the series was provided with pressure holes, the lift and drag coefficients being determined from pressure surveys at an air speed of about 30 m./sec.

The results are presented in a series of diagrams for various values of t/l, the coefficients being plotted in each case as a function of the angle of attack α with θ as parameter where

α = angle between chord and mean velocity vector between entry and discharge.
θ = angle between chord and direction of row.
l = chord length = const. = 10 cm.
t = spacing in grid.

The aerofoils were of Gottingen 549 section and the tests covered the range

α -6 to $+10°$
t/l .75 to 2
θ 10° to 30°.

In addition, tests were carried out on a single aerofoil giving lift and drag as a function of α with $t/l = \infty$.

The following are the principal conclusions :—

(1) Max. lift coefficient under retarded flow is much smaller in cascade than when isolated.
It diminishes as the spacing becomes closer (t/l decrease) and also depends on θ.

(2) The theoretical correction to the lift coefficient valid for a row of flat plates cannot be used for the present series of aerofoils.

(3) The inclination of the lift coefficient curve agrees well with the theoretical value in the neighbourhood of $\theta = 15°$.

(4) The drag coefficient for the cascade is also larger than that of the isolated aerofoils and varies with t/l and θ.

(5) The variation of angle of attack for zero lift can be calculated approximately by the method of doublets. The results are in satisfactory agreement with experiment.

Elliptic Tunnel-Wall Corrections on Drag and Stall. (J. G. Gavin and R. W. Hensel, J. Aeron. Sci., Vol. 9, No. 14, Deecember, 1942, pp. 533-537.) (108/7 U.S.A.)

The tunnel-wall effects on drag and stall, given by the usual simple corrections, are not adequate when the span-diameter ratio is high or when the spanwise lift

distribution varies considerably from elliptical. In order to determine more exact interference corrections, especially for elliptic throat tunnels of closed section, the upwash induced by the tunnel walls on the major axis, due first to the presence of lifting lines of different span lengths and then to the presence of typical wing distributions built up from these lifting lines to simulate actual wings, is computed for a number of wing distributions and spans. All the calculations are for wings whose aspect ratio is eight, and all are based on the constants of the Wright Brothers elliptic throat wind tunnel at the Massachusetts Institute of Technology.

The magnitude of these corrections is found to vary inversely with the taper ratio of the wing, the corrections being less for a highly tapered wing and more for a rectangular wing of the same span and aspect ratio. For those cases where the wing tips lie outside the foci of the throat section, the variation of the induced angle of attack along the span is no longer negligible at high lift coefficients. Its geometric effect is to cause an apparent washin angle toward the wing tip. The induced drag corrections have minimum values when the wing tips are at or near the foci of the tunnel for all usual lift distributions along the span. As the wing tips approach the tunnel wall, both the induced drag corrections and the angles of apparent washin or of apparent twist increase rapidly.

The New Training School for Sailing Flight ("*Ith*"). (Luftwelt, Vol. 9, No. 15, 1/8/42, pp. 298-299.) (108/8 Germany.)

An account is given of the official opening on July 8th, 1942, of the "Ith" Training School for sailing flight. This school, situated in the hill country of the River Weser, was established more than 10 years ago and is now one of the most important training centres for gliding in Germany. The new building can accommodate as many as 50 gliders and provides excellent living quarters for some 120 flying recruits of the National Socialist Flying Corps (N.S.F.K.). There are lecture-rooms and excellently equipped workshops offering every facility for experimental work. Under war conditions the school serves mainly as a pre-military training centre for those who will subsequently enlist in the German Air Force as pilots.

Ground Vibration Tests. (C. D. Pengelley, J. Aeron. Sci., Vol. 9, No. 3, Nov., 1942, pp. 481-490.) (108/9 U.S.A.)

The dynamics of a rigid body having two degrees of freedom is presented. The complete solutions for nodal points and coupled frequences are obtained. The general solution for the nodal positions is presented in graphic form, which provides not only a physical picture of any system but also a rapid means of evaluating the position of the nodes. Charts have been prepared from which the uncoupled frequencies, as required in flutter analysis, may be rapidly evaluated from data observed during vibration tests. Neglect of this item may produce an unconservative error of 20 per cent. in the calculated flutter speed.

A theoretical analysis is made of the factors affecting the power and unbalance required to conduct vibration tests. It is shown that for a given amplitude the power absorbed by a wing is roughly independent of aeroplane size; however, for any given aeroplane it is from two to sixteen times greater at torsional than bending resonance. At torsional resonance, with 1/10th in. total motion of the trailing edge, a conventional wing absorbs about 0.0134 h.p. Thus, the theoretical power required is negligible, and the choice of a suitable motor depends upon the friction horsepower absorbed by the test equipment.

Numerical examples are presented to illustrate the use of all principle equations and charts.

A discussion is given of the new Curtiss-Wright Universal Vibrator, outlining its major points of interest.

Determination of Aeroplane Critical Altitude by Flight Tests. (L. C. Miller, J. Aeron. Sci., Vol. 9, No. 3, Nov., 1942, pp. 491-496.) (108/10 U.S.A.)

The aeroplane critical altitude is the highest altitude in standard atmosphere at which the engine, as installed and as effected by ram and carburettor air temperature rise, will deliver its rated b.h.p. at its rated r.p.m.

The determination of this critical altitude has become of considerable importance during the last four or five years. The method presented in this paper has been developed around a practical problem on a specific aeroplane. By use of this method it has been possible to establish the high speed of a type aeroplane so that it may be checked from flights of other aeroplanes of the type and under varying atmospheric conditions. The problem applies to an installation using a two-speed single-stage mechanical supercharger. The problem becomes more complicated when two-stage supercharging and exhaust turbosupercharging are used. Some of the factors relating to the latter type of installation are indicated.

The particular benefit gained from the determination of aeroplane critical altitude is the establishment of the aeroplane high speed and the establishment of the increase of high speed effected by careful design of the carburettor air scoop for the attainment of the highest possible ram due to the dynamic pressure of the air entering the carburettor scoop.

Vector Solution of the Three-Degree Case of Wing Bending, Wing Torsion and Aileron Flutter. (L. Arnold, J. Aeron. Sci., Vol. 9, No. 3, Nov., 1942, pp. 497-500.) (108/11 U.S.A.)

It has been noticed that the two-degree analysis based on Theordorsen's theory is inadequate for the accurate determination of the critical flutter speeds of an oscillating aerofoil-flap system. Various graphic methods of solution have been devised to eliminate the computations required in the solutions of the various two-degree cases, but until now no simplified solution has been developed for the three-degree case. Though the method of solution of the three-degree case is straightforward and routine in character, the actual inherent complexity of the computations involved is such that it warrants simplified vector method of solution.

This solution is based on the fact that the components of the vibratory determinant are complex in form (real part plus an imaginary part) and therefore can be represented by a vector in the complex plane. For a given set of physical parameters the terms of the determinant are functions of the auxiliary flutter parameter $k=(\omega b/V)$ and ω (ω is the flutter frequency, b the aerofoil semichord, and V the flutter speed), while the remaining terms are functions only of k. Expansion of the determinant results in terms that are functions of k and ω and terms that are functions only of k. Since both of these groups are complex in form, they can still be represented by vectors.

Transposing these vectors, one on either side of the equality sign, the flutter speeds will be found by determining those values of k and ω for which the two vectors are equal.

Plywood in Aircraft Construction. (G. A. Allward, Annual Meeting of the A.S.M.E., Nov. 30th-Dec. 4th, 1942, Preprint No. 45.) (108/12 U.S.A.)

Shortage of aluminium has forced aircraft manufacturers to turn to alternative materials, and since plastics are as yet unsuitable for structural parts, a return to wood in aircraft construction is clearly indicated. Unfortunately, the aircraft wood worker has by now almost completely disappeared from the industry and whilst a wealth of information is available covering metal structures, comparable information on wood is extremely meagre. As a result the conversion task is very formidable, but it is hoped that with the extra steps now being taken, this lack of information will be remedied in the near future. Is is, however, already clearly apparent that resin bonded plywood offers the best form of wood for aircraft structure of the shell type. On account of its low density the effective

shell thickness (i.e. total cross-sectional area, skin plus stringers, divided by circumference of body) of the plywood structure may amount to four or five times that of the dural shell of the same weight. A dural compression panel is normally designed to support about 1,500 lb. p.s.i. (Limit is given by panel buckling.) The plywood panel of same strength-weight ratio should therefore withstand about 4,000 lb. p.s.i. for a thickness of about .2 in. Experiment shows that this needs a stringer spacing of about 8 in., but for mass production purposes it may be advisable to increase this spacing to use a slightly thicker skin ($t = .3$ in. increases the necessary spacing to 45 in.). This increase in thickness has the further advantage that the torsional stiffness of the shell is increased very markedly. Plywood is easily formed in a steam chamber so that an entire fuselage covering can be produced as two half shells. In the case of the Clark Model 46 aeroplane, only 18 man hours are required to fabricate one half shell (fuselage 20 ft. long, 6 ft. diameter). The plywood shell elements of a wooden structure are thus well adapted for mass production besides possessing the attribute of an efficient structural material.

In converting structural parts from metal to wood, experience has shown that properly designed parts will weigh less than the metal parts they replace and in most cases possess superior stiffness.

A further advantage is the absence of corrosion, whilst satisfactory surface finishes for weather protection are already available.

Air Pick-up Operations. (J. G. Gray, Mech. Eng., Vol. 62, No. 4, April, 1940, pp. 283-286.) (108/13 U.S.A.)

The pick-up system developed by All-American Aviation Inc. and utilised by the United States Post Office is described. The equipment consists of two steel poles, 30 ft. high set 60 ft. apart. A transfer rope to which the pick-up container is attached is suspended horizontally between the poles, the container of 60 lb. capacity resting at the centre. The pick-up mechanism installed in the plane consists of a manually operated winch provided with a brake and ratchet control together with an air-oil shock absorber. The pick-up cable is 55 ft. long and has a four-fingered grapple weighing 8 lb. at its lower end. In making a pick-up, the plane passes the masts at an altitude of about 60 ft., with the cable trailing the grapple about 10 to 25 ft. above the ground when it strikes the transfer ropes. The pick-up contained is attached to the transfer rope by a special energy absorbing device which slides gradually along the rope and giving the container about 30 ft. in which to accelerate. This is the essential part of the mechanism, since it renders possible the installation of a relatively simple subsidiary shock absorber in the plane.

Pick-ups are carried out at about 110-125 m.p.h., and over 13,000 pick-ups have been carried out successfully during seven months' operation.

Usually delivery is combined with pick-up, the delivery container trailing behind the grapple on a separate rope.

Night operation presents no special difficulties. It is stated that the necessary ground equipment costs less than 200 dollars and that the complete outfit comes to less than 2,000 dollars. Photographs give details of the method of rope suspension employed.

Cargo Glider Pick-up. (R. C. Du Pont, 63rd Annual Meeting of the A.S.M.E., 2/12/42, Preprint No. 105.) (108/14 U.S.A.)

The Air Mail Pick-up service was started by the American Post Office Department in 1939 and has now been placed on a permanent basis by the Civil Aeronautics Board. The equipment is designed for dead weight loads of 50 lb., but loads of the order of 100 lb. have been successfully handled and equipment now in military use can pick up much heavier loads.

Since short hauls seem to offer the best field for cargo glider operation, a similar method of pick-up becomes most attractive, since it will enable a high

average speed to be maintained between the terminals and expensive runways will only be needed at main ports, where the tug lands.

Experience in mail pick-up operation has shown that such pick-ups can be carried out at speeds substantially above the cruising speed, and glider pick-up experiments have already demonstrated that this will also apply to the tug. In recent tests eight consecutive glider pick-ups were made at intervals of every four minutes, using the same glider and pick-up tug.

The author gives some figures on the relative cost of transport by single aircraft and for the case when the load is distributed over the tug and a number of gliders.

It is, of course, obvious that carrying all the load inside the tug must be more efficient from the point of view of drag alone, provided of course that a sufficiently large aircraft is available. The load balance of such machines requires, however, careful consideration and bulky packages may present serious stowage difficulties. Load distribution is easier on the glider train and the glider can be designed specially to take bulky goods.

The main advantage of the glider train, however, is the fact that the load can be dropped on the way, landing on quite small fields.

If a fresh glider can be picked up, we have a flexible cargo transport needing only inexpensive ground equipment.

New Developments in Simplified Aircraft Control. (R. H. Upson, J. Aeron. Sci., Vol. 9, No. 14, December, 1942, pp. 515-520 and 548.) (108/15 U.S.A.)

Problems of control are presented from a standpoint of simple operation rather than mere mechanical simplicity. Of first importance is the elimination of inconsistent or abnormal behaviour in which spinning is classed. The influence of wing and engine position is discussed, and several advantages of an automobile-type wheel arrangement are brought out.

A primary control, in which flaps are co-ordinated with elevator and rudder with ailerons, is advocated. In a possible supplementary pedal control, ground brakes are co-ordinated with air drag obtained by opposite deflection of two rudder surfaces.

Special problems, considered from a standpoint of simplified control, include stability against overturning on the ground, inertia loads on the wing, spiral stability, and control requirements for following a compass course.

The ideal aeroplane for private flying is described as being: outstanding in vision, incapable of spinning, comparable with an automobile in simplicity of control, yet with unquestioned superiority of cross-country performance.

Proportioning a "Canard" Aeroplane for Longitudinal Stability and Safety Against Stall. (J. V. Foa, J. Aeron. Sci., Vol. 9, No. 14, December, 1942, pp. 523-528.) (108/16 U.S.A.)

The conditions for static longitudinal stability and controllability and for safety against stall of a Canard-type aeroplane are investigated.

It is found that the designer's freedom of initiative in proportioning a Canard is restricted in very definite ways. The fact that some of these restrictions have probably not been entirely known may serve to explain some of the failures of the past.

The rules that must be followed in order to secure longitudinal stability and controllability and safety against stall are determined for both the conditions of power-off and power-on, whether the high-lift devices are operating or not.

High-lift devices on the tail only, as they have been used in two recent Canards, are found to be dangerous, unless the range of the allowable e.g. locations is greatly reduced. The use of tail high-lift devices when the wing is equipped with flaps is recommended, but it is found that the wing and tail high-lift devices must be operated in conjunction with each other and under a single control. The relation that must exist between their deflections is established.

The procedures for the selection or determination of the aerofoil section, aspect ratio and area of the tail surface, tail length and angle of setting of the stabilizer are indicated.

It is felt that the tail-first aeroplane still deserves the earnest attention of designers.

Measurement of Aero Engine Torque on High Altitude Test Benches and in Flight. (C. R. Himmler, Z.V.D.I., Vol. 84, No. 26, 29/6/40, pp. 445-452.) (R.T.P. Translation No. 1,709.) (108/17 Germany.)

The DVL high altitude test benches both for air and liquid cooled engines are described.

The benches follow the normal procedure of limiting altitude conditions to the intake and exhaust, the outside of the engine remaining under normal atmospheric condition. No fundamental objection can be raised to this for liquid cooled engines. In the case of air-cooled cylinders, however, both reduction in the density and temperature of the cooling air would be desirable for more accurate correlation between ground tests and altitude performance. In view, however, of the large quantities of cooling air required, this presents great difficulties and although incorporated in the high altitude test benches of the Fiat Works (Italy) the extra cost and complication is not considered worth while by the author. The DVL test benches utilize coupled hydraulic and electric dynamometers. By a suitable division of the lead between these two types, any desired speed-torque characteristic of the brake can be achieved. At the same time, by providing the electrical dynamometer with Leonard Control, constant speed operation can be assured. For routine testing, the electrical equipment need only be designed for one-third of the total load, the remainder being absorbed hydraulically. This leads to a considerable reduction in the cost of the equipment.

The test benches described appear to have a capacity of about 1,200 h.p. at simulated altitudes up to 24,000 ft. It is interesting to note that provision can be made for testing two liquid power plants simultaneously on the same test bench (attachment at opposite ends of brake).

In the case of air cooled cylinders, it is stated that a considerable saving in cooling fan power can be effected by providing for an increased air density at a reduced speed.

After describing some characteristic performance curves obtained with these test beds, the author turns to the alternative method of measuring the torque in flight. Such instruments may have either electrical or mechanical recording. A representative type of the former class has been developed by Muir at the R.A.E. and depends on recording the deformation of a spring element by the corresponding change in magnetic induction (so called air gap method).

Mechanical recording is employed by the DVL torquemeter; whilst the Pratt and Whitney instrument (much used in the U.S.A.) employs a hydraulic transmission which gives continuous indication on a pressure gauge in the cockpit.

The calibration of all these torquemeters is rather uncertain and absolute measurements are thus in doubt. Even relative measurement, however, forms a valuable extension of the work done on the high altitude test bench. The author expresses the hope that in due course a reliable instrument for routine flight testing of normal power plants will be developed.

An extensive bibliography (49 items) is given.

(See also by the same author: "Test benches for altitude investigation," R.T.P., Trans., No. 1068; ditto, with special reference to DVL distant reading instruments, R.T.P., Trans., No. 1067.)

Rating Supercharged Engines on the Basis of the Mean Temperature of the Cycle. (Ralph Miller, A.S.M.E., Dec. (1942), Meeting. Preprint No. 39.) (108/19 U.S.A.)

The author analyzes the temperature conditions of non-supercharged and supercharged Diesel engines and bases the work on the assumption that the capacity

of a prime mover which converts heat into work is limited by the temperatures to which its mechanism is subjected in the process. The exhaust-gas turbine used in the Buchi supercharging system may not be operated above 1020 F. gas temperature. It is evident that the Diesel engine likewise reaches a limiting gas temperature as the load is increased. It is demonstrated that engines supercharged with blowers, having an adiabatic efficiency of about 75 per cent. and operating without air cooling, cannot be loaded above 140 per cent. of the brake horse-power of the naturally aspirated engine without exceeding its temperatures or maximum pressures. The paper further develops the importance of removing the hot clearance gases. With a clearance volume of 8 per cent., the indicated horse-power is increased 18 per cent. with no supercharging, by removing the clearance gases only. The capacity of Otto-cycle engines with large clearance volumes and high residual-gas temperatures would be increased considerably more than 18 per cent. by the scavenging method described.

Effect of Altitude on Knock Rating in C.F.R. Engines. (D. B. Brooks, Bur. of Stands., J. Res., Vol. 28, No. 6, June, 1942, pp. 713-734.) (108/20 U.S.A.)

Knock ratings made at altitude have shown systematic differences from ratings made at sea level, on some fuel types. Altitude-chamber tests showed that complete agreement could be obtained if tests were made at uniform knock intensity, and that uniform knock intensity was obtained when the cylinder clearance volume was reduced in linear relation to air pressure. From these tests, equations are developed to relate clearance volume for standard knock intensity to air pressure and to octane number for the ASTM Motor and the CFR Research Methods of knock rating. Equations are also developed to relate octane-number requirement to air pressure, and these are shown to agree with road-test data.

It appears that:—

1. The micrometer setting giving constant knock intensity is a linear function of air pressure, the derivative of this function being invariant with octane number and being 0.030 in. per in. Hg for the ASTM Motor Method and 0.020 in. per in. Hg for the CFR Research Method.

2. The effect on knock intensity of a change in volumetric efficiency caused by change of venturi size or other restriction can be compensated by a change of micrometer setting, the amount of this change being the same at all altitudes and all octane numbers.

3. For both test methods, the micrometer setting for standard knock intensity is a direct polynomial function of the octane number, within experimental error.

4. The functions relating octane-number requirement of CFR engines to altitude are derivable from the guide curves, and appear to be of general applicability.

The Intrinsic Theory of Elastic Shells and Plates. (J. L. Synge, W. Z. Chien, Kármán's Anniversary Volume of Applied Mechanics, pp. 103-120.) (Reprint available.) (108/21 U.S.A.)

The various approximations used in the theory of the equilibrium of thin shells and plates are confusing. The purpose of the authors is to systematize the theory by developing a basic exact theory into which the various approximations may be fitted. The present contribution is devoted to setting up the six microscopic equations of statical equilibrium to tensor notation, and throwing the microscopic equations of elastic equilibrium and compatibility into a suitable form. All emperical assumptions are avoided and the theory is exact. Approximations will be treated in a later paper.

Predicting Stiffness and Stiffened Panel Crippling Stresses. (A. B. Crockett, J. Aeron. Sci., Vol. 9, No. 3, Nov., 1942, pp. 501-509.) (108/22 U.S.A.)

An empirical method is presented for predicting the crippling stress at $l/\rho < 20$ of 24 S-T Alclad bent-up sheet stiffeners, 24 S-RT Alclad bent-up

sheet stiffeners, and 24 S-T extruded stiffeners acting alone or in conjunction with 24 S-T Alclad sheet as a panel. L=length of stiffener or panel in., ρ=radius of gyration of stiffener alone about an axis parallel to sheet, in. It is also shown that predicted column curves may be constructed by drawing a straight line tangent to the Euler column curve (fixity constant $c=1.5$) through the predicted crippling stress at $L/\rho=20$ (except through $L/\rho=40$ for extrusion stiffened panels); the predicted stress at $L/\rho=20$ (or 40) locates the horizontal cut-off for the section of the column curve with $L/\rho<20$ (or 40).

The general method, which consists of summing the crippling loads of the component elements of the stiffener and then dividing by the summation of the elemental areas to obtain the crippling stress, is discussed in several texts on airplane structural analysis; however, enough test data have not been available heretofore to establish general empirical curves for predicting the strength of any stiffener or stiffened panel of reasonable proportions.

Rational Analysis of Tension Field Beams. (H. W. Sibert, J. Aeron. Sci., Vol. 9, No. 3, Nov., 1942, pp. 510-514.) (108/23 U.S.A.)

The commonly accepted theory of tension-field beams was first given by Wagner and was later summarized by Kuhn. Wagner's theory is based upon the assumption that the force in each flange of a tension-field beam is in the direction of the flange. It will be shown later that Wagner's analysis gives the correct solution for a particular type of beam of constant cross section. For all other beams his analysis will give erroneous results.

Wagner's fundamental assumption is the result of an attempt to simplify the problem of the bending of a metal wing by assigning different functions to the different parts of the wing—namely, the bending moment is to be resisted by the flange material and the vertical shear by the shear web in conjunction with the vertical components of the forces in the flanges. In this paper the wing is considered as a whole and the stresses in the tension-field shear web are determined by a method similar to that for finding the longitudinal shear stresses in a beam with a shear resistant web. Approximate formulas are then developed which can be applied to beams of either constant or variable cross section.

Application of Maclaurin Series to Beams Under Simultaneous Transverse and Axial Loading. (A. G. Strandhagen, J. Aeron. Sci., Vol. 9, No. 14, December, 1942, pp. 529-532.) (108/26 U.S.A.)

The method of determining the elastic line of columns and struts is, to start with, the fundamental equation $(d^2y/dx^2)=-M/EI$, and by two quadratures the deflection curve $y=f(x)$ is obtained. Most of the current methods carry this procedure through in some manner or other. While these methods are practical, it can be shown that in many cases other methods are shorter. As an illustration, application of the Maclaurin formula in solving for the deflection curve of beams was shown by Hetenyi. In this paper the writer extends the Maclaurin formula, which developed a function of real variable, say x, into a polynomial plus a remainder, to an infinite series known as the Maclaurin series, which expresses the function as a power series provided the remainder after n terms converges toward O as n become infinite.

Use of the Maclaurin series simplifies the solution of many problems and therefore should be of interest to engineers.

There is no approximation involved in this procedure since all terms are included, as will be evident from the expansion in the illustrative examples.

Notes on Some Secondary Stresses in Thin-Walled Box Beams. (E. Reissner. J. Aeron. Sci., Vol. 9, No. 14, December, 1942, pp. 538-542.) (108/27 U.S.A.)

An analysis is made of the secondary stresses that arise in flat-sheet-covered box beams in which the curvature of the cover sheets does not conform with the

curvature assumed by the extreme fibres of the spars when the beam is loaded. Formulas are derived for rib loads and for secondary sheet bending stresses as function of the primary sheet stress, the rib spacing, the beam height and the cover sheet thickness. With regard to the secondary stresses, the flexibility of ribs and spars, which in principle can be taken into consideration, is neglected so that the values obtained for the stresses are conservative. It is found that secondary sheet bending is largely restricted to narrow edge zones adjacent to ribs and spars.

Determination of Stresses from Strains on Three Intersecting Gauge Lines and its Application to Actual Tests. (W. R. Osgood and R. G. Stronn, Bureau Standard, Vol. 10, 1933, pp. 685-692.) (108/28 U.S.A.)

If ϵ_x and ϵ_y are the strain components at a given point along rectangular co-ordinates in the plane of stress, and ϵ'_x and ϵ'_y are similar components about a second set of axes x', y' making an angle ψ with the first, the following relationship holds:—

$$\epsilon'_x = \tfrac{1}{2}(\epsilon_x + \epsilon_y) + \tfrac{1}{2}(\epsilon_x - \epsilon_y)\cos 2\psi + \tfrac{1}{2}\gamma \sin 2\psi$$
$$\epsilon'_y = \tfrac{1}{2}(\epsilon_x + \epsilon_y) - \tfrac{1}{2}(\epsilon_x - \epsilon_y)\cos 2\psi - \tfrac{1}{2}\gamma \sin 2\psi$$
$$\gamma' = (\epsilon_x - \epsilon_y)\sin 2\psi + \gamma \cos 2\psi$$

where γ = shearing strain with respect to axes x and y,

γ' = ,, ,, ,, ,, x' and y'.

If at a given point the strain components ϵ_1, ϵ_2 and ϵ_3 making angles ψ_1, ψ_2 and ψ_3 with any axis x are known, the state of strain (ϵ_x, ϵ_y, γ) at the point as well as the principal strains can be determined by a geometrical construction, details of which are given (so-called dyadic circle).

When the principal strains ϵ_u and ϵ_v and the numerically greatest shearing strain γ max. have been found, the principal stresses σ_u and σ_v and greatest shearing stress τ max. follow from the equations:—

$$\sigma_u = \left\{ \frac{m^2 E}{(m^2-1)} \right\} \left\{ \epsilon_u + \left(\frac{1}{m} \right) \epsilon_v \right\}$$
$$\sigma_v = \left\{ \frac{m^2 E}{(m^2-1)} \right\} \left\{ \epsilon_v + \left(\frac{1}{m} \right) \epsilon_u \right\}$$
$$\tau \text{ max.} = G\gamma \text{ max.}$$

where $1/m$ = Poisson's ratio.
E = modulus of elasticity.
G = shearing modulus.

$$= \frac{mE}{\{2(m+1)\}}$$

The author describes application of the method to stress determinations in dams, bearing plates, beams and gusset plates.

Whilst three gauge lines are theoretically sufficient, four or more lines may be employed. The dyadic circle now becomes over-determined, since it will have more than three tangents. In this case the circle giving the best fit is drawn.

In conclusion, it must be emphasised that the results obtained only apply to the surface of a three-dimensional body. If the body has, however, only two principal dimensions, a complete picture of the state of stress is obtained.

Influence of Delayed Quenching During Solution Test Treatment on the Resistance of Dural to Intercrystalline Corrosion. (J. C. Arrowsmith and G. Murray, Sheet Metal Industry, Vol. 16, No. 188, December, 1942, pp. 1,879-1,884.) (108/30 Great Britain.)

The effect of varying the delay period between removing duralumin from the heating furnace and quenching in water has been studied with particular reference to the corrosion resistance of the product. It has been established that this delay

should be not more than 10 sec. if a high degree of resistance to intercrystalli corrosion is to be ensured in thin gauge metal.

Coastal atmospheric corrosion tests on duralumin-type alloys, which we protected by various type of surface treatment have been carried out. The demonstrate that accelerated corrosion tests on the bare metal should not b regarded as sure indication of the ability of a material to withstand servi conditions. In particular it is shown that the resistance of the core of aluminium coated aluminium alloy to intercrystalline corrosion is of only minor significan in determining the behaviour of the composite material.

Use of Bismuth in Fusible Alloys. (Circular of the Bureau of Standards, No. 38 December 15th, 1930.) (108/32 U.S.A.)

The literature and use of fusible alloys (Pb, Bi, Sn, Cd) are reviewed in th paper (up to 1930).

Two, three or four component fusible metals are discussed, special attentio being given to volume change in the alloys during and after solidification.

The principle use for fusible alloys is in soldering, and since several of the wet glass, they are admirably suited for making seals and gastight joints in glas apparatus. Other applications are: Safety devices against fire, heat treatme baths and material testing (grips can be cast on pieces of irregular cross-sectio and subsequently removed without risk of injuring specimen, since melting temperature alloy is generally below 100°C.).

Bismuth head alloys will expand or contract during solidification, depending on whether the bismuth content is greater or less that 52 per cent.

It is interesting to note that the melting point of quaternary fusible alloys (≃70°C.) can be appreciably lowered by the addition of mercury and this fiv component alloy will remain liquid at room temperature if enough mercury is added.

Properties of Lead-Bismuth, Lead-Tin, Type Metal and Fusible Alloys. (J. G. Thompson, Bureau of Standards Research Paper, No. 248, November 1930.) (108/33 U.S.A.)

LEAD-BISMUTH.

The mechanical strength was obtained from cast test bars of standard dimensions. On account of the ductility of the alloy, the rate of application of the load was fixed to correspond to a rate of travel of the free head of the testing machine of 0.5 in. per minute.

The composition 0-52 per cent. Bi was investigated, the tensile strength increasing fairly uniformly from 2,000 to 6,000 lb. per sq. in. over the range.

The elongation of the 25 per cent. Bi alloy is of the order of 40 per cent., the Brinell hardness (10 mm. ball 100 kg. for one minute) being 8, melt point ≃ 250°C. The hardening effect of Bi on lead is less than that of antimony, and Lead-Bi alloys containing up to 12 per cent. Bi can be readily rolled into sheet $\frac{1}{32}$ in. thick There seems to be no susceptibility to heat treatment or age hardening.

LEAD-TIN.

For tin contents between 30 and 45 per cent.

Tensile	...	...	=6,900 lb./sq. in. Melting point ≃ 250°C.
Elongation	...	...	= ~ 100 per cent.
Brinell hardness	..		= ~ 12.

TYPE METAL.

A representative monotype consists of a 70/20/10 lead-antimony-tin alloy characterised by a relatively high tensile strength (12,000 lb. per sq. in.) and Brinell hardness (25). The elongation is normal (3 per cent.). Melting point 240°C.

The casting properties can be improved by the addition of 1-4 per cent. of Bi.

FUSIBLE ALLOYS.

The mechanical properties of Wood's alloy are given below:—

Per cent. composition		Bi 50. Melting point ~ 70°C.
		Pb 26.7.
		Sn 13.3.
		Cd 10.
Tensile	... ...	6,000 lb. per sq. in.
Elongation	... ...	140 per cent.
Brinell hardness	...	9.

The alloy can be drawn to wire without difficulty.

The addition of 10 per cent. mercury reduces elongation by over 50 per cent. and lowers melting point to 64°C. without appreciably affecting tensile strength. The alloy, however, now becomes susceptible to ageing.

Carburizing Characteristics of 0.20 per cent. Carbon Alloy and Plain Carbon Steels. (G. K. Manning, 24th Annual Convention of the A.S.M., October, 1942.) (Preprint No. 5.) (108/34 U.S.A.)

Eight common carburizing steels were tested in five different commercial solid carburizers.

Chromium steels produced cases with extremely high surface carbon content when carburized in four of the carburizers. Only one of the carburizers tested resulted in low surface carbon concentration for chromium steels. Nickel opposed chromium in its effect on surface carbon concentration.

Contrary to a common belief, lower carburizing temperatures did not result in cases of greater surface carbon content.

A low carbon skin (0.003 to 0.001 inch deep) was observed to be present after carburizing for 10 hours or longer at 1700 degrees Fahr. (925 degrees Cent.) but was not found at lower carburizing temperatures.

Bursting Tests on Notched Alloy Steel Tubing. (G. Sachs, 24th Annual Convention of the A.S.M., October, 1942.) (Preprint No. 7.) (108/35 U.S.A.)

Heat treated alloy steel tubing subjected simultaneously to circumferential and longitudinal tension showed slightly higher tensile strengths and much lower ductility values in the circumferential direction than rod tested in tension.

A sharp longitudinal notch on the outside surface of the tubing was found to be the most severe embrittling agent observed so far, in that steels with a strength level as low as 150,000 pounds per square inch had a notch strength less than the strength of unnotched tubing.

Such a single notch did not have the strength-increasing effect which was expected for sufficiently ductile conditions. A double notch (on both inside and outside surface), however, did produce such a strength-increasing effect, but the increased lateral stress which is responsible for such an effect did not cause any greater embrittlement than a single notch.

The conditions of fibre direction are usually considered to be less favourable in tubular specimens machined from solid rod and subjected to internal pressure than for drawn tubing. However, no such effect of fibre direction was observed in tests on notched tubes machined from rod.

Notched Bar Tensile Tests on Heat-Treated Low Alloy Steels. (G. Sachs, 24th Annual Convention of the A.S.M., October, 1942.) (Preprint No. 8.) (108/36 U.S.A.)

Various oil-hardening alloy steels of the 0.40 per cent. carbon class were tested as notched tensile test bars in various conditions of strength level as determined by the tempering temperature.

It was found that the ductility of the steel was considerably reduced in the notched section, but that the notch strength was not impaired as long as the

steel had an ultimate strength below 200,000 pounds per square inch. For such soft steels, the strength was increased by a percentage which was approximately equal to the percentage cross-sectional area removed by the notch. For stronger steels, a shallow notch did not seriously affect the notch strength and notch ductility. However, the ductility of deeply notched specimens was nearly zero and their strength greatly reduced. This condition prevailed for steels with an ultimate strength of between 220,000 and 280,000 pounds per square inch, although the ductility given by ordinary tensile tests remained almost as high in the strength region as for the softer steels. Thus the values found from an ordinary tensile test are not a sufficient criterion of the suitability of a steel for commercial applications involving shoulders, keyways, and other irregularities in shape that produce a similar effect to that of a deep notch.

The embrittling effect of factors such as overheating and large section size is not shown by ordinary tensile tests, but it is readily observed from the results of notched bar tensile tests.

An attempt has been made to correlate the results with the shape of the stress-strain curve for the notched section, and with previous conceptions of the laws of plastic flow and the stress distribution in a notched section.

Stress-Strain Measurements in the Drawing of Cylindrical Cups. (E. L. Bartholomew, 24th Annual Convention of the A.S.M., October, 1942.) (Preprint No. 9.) (108/37 U.S.A.)

Cup wall stresses are determined for various blank diameters. The tensile stress in the cup wall for the maximum diameter blank is compared with the actual stress from the tensile test. The tensile test data are reported in the form of the s—q′ plot. Strain measurements are also made in the cup walls. The maximum blank diameter which may be successfully drawn is determined from the tensile test data. The maximum blank diameter for a metal in a given set of press conditions represents the limit of drawability of that metal. Since the tensile test data can be used to determine this blank diameter, then, in effect, they are an index of the drawability of the metal. Brass, aluminium and deep drawing sheet are tested. General stress-strain comparisons are made to show the possibilities of this particular interpretation of tensile test data.

Influence of Strain Rate on Strength and Type of Failure of Carbon-Molybdenum Steel at 850, 1,000 *and* 1,100 *Degrees Fahr.* (R. F. Miller, 24th Annual Convention of the A.S.M., October, 1942.) (Preprint No. 24.) (108/38 U.S.A.)

Elevated temperature tensile tests were carried out on pearlitic and spheroidized carbon-molybdenum steel at a series of uniform strain rates. As the strain rate was decreased, the tensile strength decreased, the elongation first increased and then decreased, and the mode of fracture changed from transgranular to intergranular. It was concluded that intergranular failure is normal in metals strained slowly at elevated temperature, and that it does not necessarily indicate deterioration of the material, or lack of plasticity preceding fracture.

The Hardening of Tool Steels. (P. Payson, 24th Annual Convention of the A.S.M., October, 1942.) (Preprint No. 29.) (108/39 U.S.A.)

The reactions which take place during the heat treatment of eleven commercial tool steels, from plain carbon to high speed, have been studied, and the transformation temperature time curves of the austenities of these steels are presented. The formation of the martensite in these steels is discussed, and emphasis is placed on the need for cooling the steels to low temperatures, in the hardening operation, before tempering is started. Finally, some data are presented to show the effects in these steels of variations in austenitizing temperatures on the formation of martensite, and on the retention of austenite at room temperature.

The Effect of Moderate Cold Rolling on the Hardness of the Surface Layer of 0.34 per cent. Carbon Steel Plates. (H. K. Herschman, 24th Annual Convention of the A.S.M., October, 1942.) (Preprint No. 34.) (108/40 U.S.A.)

The influence of moderate cold rolling on the surface indentation hardness of 0.34 per cent. carbon steel plate initially surface finished by three different methods was investigated. Variations of the hardness of the surface layers extending to different depths below the surface of the specimens were determined by applying different loads on a Knoop indenter. Indentation hardness tests also were made with the Rockwell superficial hardness machine. The results obtained with the Knoop indenter showed significantly lower hardness numbers for the superficial layer of the steel after the lighter degrees of rolling, the magnitude of change apparently being influenced by the mode of initial finishing. Hardness decreases were not revealed by tests made with the Rockwell superficial machine nor in any case in which the penetration of the Knoop indenter exceeded about 0.0003 inch.

Corrosion of Unstressed Specimens of Alloy Steel by Steam at Temperatures up to 1,800°F. (G. A. Hawkins and others, A.S.M.E., Dec. (1942) Meeting.) (Preprint No. 38.) (108/41 U.S.A.)

This paper presents the results of tests made at the Engineering Experiment Station of Purdue University to determine relative resistance to corrosion by steam of unstressed specimens of various alloy steel at temperatures of 1500 F. and 1800 F. The data include results from 500-hr. tests at 1500 F. and 1800 F. for a representative selection of steels containing up to 18 per cent. chromium, and for a 500-hr. and a 1300-hr. test on 25-20 and 25-15-2w steels at 1800 F. The results permit extension of previously published data to cover the temperature range from 1000 to 1800 F. All of the steels tested except the 25-20 and 25-15-2w specimens show rapid corrosion beyond a limiting temperature which increases with chromium content. The 25-20 and 25-15-2w steels were extremely resistant to steam corrosion for exposures up to 1300 hr. at 1800 F.

Relief of Residual Stress in Streamline Tie Rods. (R. E. Pollard and F. M. Reinhart, Bur. of Stands. J. Res., Vol. 28, No. 6, June, 1942, pp. 755-772.) (108/42 U.S.A.)

A high percentage of the streamline tie rod failures examined at the National Bureau of Standards have been attributed to torsional fatigue due to synchronous vibrations. One characteristic feature of such failures, in the streamline portion of the tie rod, is that fracture invariably starts at or near the intersection of the minor axis with the surface.

The reduction to streamline section is usually performed by rolling or drawing. In most tie rods the high physical properties required are produced by cold-working during these operations. Such tie rods naturally contain very high residual (internal) stresses. Residual stresses may be dangerous in highly stressed members, such as tie rods, particularly when the distribution of stress is such that it acts in the same direction as the superimposed service stress.

In most tie rods, the residual stress is so distributed that the highest tensile stress occurs at the intersection of the minor axis of the cross section with the streamline surface. This is the point at which the fractures start. High residual stresses, therefore, probably are important contributory causes of failure in these tie rods.

About two-thirds of the residual stress in cold-worked S.A.E. 1050 steel tie rods was relieved by heating them 30 minutes at 600° F. Cold-worked austentic stainless steel tie rods could be heated at temperatures up to 1,000° F. without lowering the important physical properties. With materials of straight 18-8 composition, however, the limiting heating temperature was found to be about 900° F., because at higher temperatures precipitation of chromium carbide occurred. It is possible that materials containing additions of titanium,

columbium, or molybdenum could be heated at higher temperatures, since the carbides of these elements would be precipitated in preference to chromium carbide.

Microscopic examination and Vickers indentation tests indicated localized differences in the amount of cold-working. Such differences may explain the distribution of residual stress in cold-worked tie rods.

The Effect of Hardness on the Machinability of Six Alloy Steels. (O. W. Boston, 24th Annual Convention of the A.S.M., October, 1942.) (Preprint No. 4) (108/43 U.S.A.)

The effect of hardness on the machinability of steel was studied by means of a series of tuning tool-life tests on six alloy steels in the quenched and tempered condition. The tool material, tool shape, size of cut, and cutting fluid represented commercial practice. The results show marked sensitivity of machinability to hardness in all six of the types of alloy steel tested. These steels gave a wide range of machinability ratings, particularly at high hardness. However, the difference in machinability between two heats of the same type of steel was as great as the range covered by the six types. There appears to be a direct correlation of hardenability with machinability of the harder steels.

On the Location of Flaws by Stereo-Radiography. (J. Rigbey, 24th Annual Convention of the A.S.M., October, 1942.) (Preprint No. 18.) (108/44 U.S.A.)

Stereoscopic radiographs utilizing two exposures corresponding to two positions of the X-ray tube, usually about a foot apart, may be made on a single film instead of separate films as is customary. This double exposure method enables direct measurement of the distance between the two images of an internal defect in the subject radiographed. From this measurement, the vertical position of the flaw can be deduced mathematically rather than by visual estimation in which the two films are set up in a stereoscopic viewing stand. Hence this method also eliminates the necessity of special viewing apparatus.

In experiments with cast aluminium and steel blocks up to two inches in thickness, it was found that the consequent reduction in sensitivity and definition is not prohibitive where a sensitivity of 2 per cent. in aluminium and 4 per cent. in steel is sufficient. The vertical position of holes of regular shape can often be measured with an error of only ±3 per cent. although larger errors must be expected in practice where flaws are more irregular.

The Fluorescent Penetrant Method of Detecting Discontinuities. (Taber de Forest, 24th Annual Convention of the A.S.M., October, 1942.) (Preprint No. 19.) (108/45 U.S.A.)

Cracks and porosity in metals may be located by a suitable penetrating fluid carrying a highly fluorescent dye. When illuminated by near ultraviolet light, the extremely minute quantities drawn into the cracks by capillary attraction are unmistakably identified. The new test is similar to the oil and whiting method, but is far more sensitive and more rapid in application. Only capillary spaces open to the surface can be found, but experience has shown that many vital defects are of this character, especially in the light metals.

Photographs are shown of typical non-ferrous parts commercially inspected by the new method.

Practical Aspects of Making Expanded Joints. (C. A. Maxwell, Annual Meeting of the A.S.M.E., Nov.-Dec., 1942.) (Preprint No. 36.) (108/46 U.S.A.)

As one of three current papers on the general subject of rolling-in boiler, heat-exchanger, and condenser tubes, this presentation deals more particularly with the practical application of recent tube-expanding equipment and methods largely developed by The Babcock and Wilcox Company. Progress in the solution of tube-rolling problems from 1924, when axial movement of tubes in

their seats became particularly acute, down to the present time is noted by the author, accomplishments in this direction being the work of comparatively few engineers who have devoted their attention to the various aspects. Only since 1940, when a new expander was developed, have the weaknesses of the standard expander been overcome, making possible the expanding of tubes in seats of unlimited width. There are three basic tools for producing expanded joints from which all others are derived, the roll, the prosser, and the ball-drift expander. Details of each are given. The procedures followed are explained comprehensively, as it is also the function of the ball-drift expander used for relatively small tubes in thick seats.

Production of High Speed Helical Gears. (S. A. Gouling, Engineer, Vol. 175, No. 4,543, 5/2/43, pp. 119-120.) (108/48 Great Britain.)

Main conclusions:—

1. A hobbing machine with a properly designed solid master worm wheel will cut accurate and quiet-running gears, assuming that the hobbing machine size is properly related to the diameter of the cut gears.

2. Accuracy and quiet running are assisted if helical gears are cut by hobbing machines arranged for use without the differential mechanism.

3. Noise originates from the characteristics of the tooth flank of gears just as from the face of a gramophone disc. Therefore gear box construction, materials, etc., are only of secondary influence on gear noises. The total load on the gear teeth affects apparent noise volume very little.

4. As a consequence of (1) the simpler machine tool with the solid worm wheel enables gear noises to be diagnosed and cured more easily, including the differentiation between hobber noise and contact frequencies caused by flank or alignment errors.

World Production of Magnesium in Metric Tons. (Imperial Institute, Mineral Resources Dept. Report on Magnesium, 1939, pp. 23-24.) (108/49 Great Britain.)

	1933	1934	1935	1936	1937	1938
Germany	—	Figures not available			12,000	14,000
G.B.	—	Figures not available			2,000	3,000
U.S.A.	641	1,897	1,893	1,743	2,000	3,000
France	128	241	419	1,365	1,800	2,000
Japan	103	139	350	650	1,200	1,500
U.S.S.R.	—	Figures not available			700	1,000
Switzerland	—	Figures not available			230	300
Italy	—	—	—	—	70	200

According to American Aviation (1.10.41, p. 13) the U.S.A. production of magnesium is estimated at 10,000 tons for 1941 and an output of 100,000 tons is hoped for by 1943.

World Production of Aluminium in Metric Tons. (Metal Statistics, 1939 (U.S.A.), p. 503.) (108/50 U.S.A.)

Figures are in units of 1,000 tons.

	1933	1934	1935	1936	1937	1938
Germany	18.9	37.2	70.8	97.5	127.5	175.0
G.B.	11.0	13.0	15.1	16.4	19.4	24.0
Canada	16.2	15.5	20.6	26.9	42.6	50.0
U.S.A.	38.6	33.6	54.1	102.0	132.8	130.1
France	14.3	15.1	22.0	28.3	34.5	40.0
Japan	—	.7	4.0	6.7	10.5	15.0
U.S.S.R.	4.4	14.4	24.5	37.9	45.0	50.0
Switzerland	7.5	8.2	11.7	13.7	25.0	28.0
Italy	12.1	12.8	13.8	15.9	22.9	28.0

According to American Aviation (1.10.41, p. 19), the U.S.A. production in 1943 is estimated at 300,000 tons.

Photographic Templates. (E. C. Jewett and C. D. Tate, Mech. Engg., Vol. 64, No. 11, Nov., 1942, pp. 787-792.) (108/51 U.S.A.

In aeroplane production, several templates may be required for each part and several copies of each template may be necessary where a number of production lines are occupied on the same models. Thus contour, jig, bending, and checking templates may be required, and for a simple aeroplane model as many as 25,000 templates may be used. Laying out these templates by hand would not only be very laborious, but errors may arise. To overcome this difficulty, both photographic and non-photographic methods for template production have been investigated. The present article only deals with the former process, which may be carried out either by contact or projection. In either case the template material is coated with a photographic emulsion. This is most conveniently carried out by the use of a transfer paper (carrying the emulsion) which is cemented on to the template, emulsion side in contact. Subsequent stripping of the paper leaves the template coated with a firmly adhering photo sensitized layer. The method can be applied both to metals and wood or plastic templates.

In the direct contact process, the original drawing is placed over the sensitized sheet and exposures made either by direct light or X-rays. In the former case the original must be traced on glass or a transparent plastic which is not always convenient. For this reason X-ray exposure is now favoured. When using X-rays, the original pencil drawing is made on a sheet which has been sprayed with X-ray phosphorescent lacquer.

The phosphorescence induced by X-rays persists for some time and several contact prints can be obtained on the sensitized template material for one X-ray exposure. In its simplest form the direct contact process (whether by light or X-rays) leads to mirror images of the master drawing. If true copies are required, an intermediate negative will be necessary. This generally presents no difficulties.

The main disadvantage of the contact process lies in the fact that no change in scale is possible in the reproduction. On the other hand the outlay for the plant is moderate, the X-ray apparatus being considerably cheaper than the large size camera required for photographic reproduction.

In this method a reduced size negative ($\frac{1}{4}$ to 1/5th size) is made on a glass plate and then projected to any desired scale on to the sensitized template material. The main drawback is the expense of the camera and its mounting. The equipment can, however, be also used to produce reduced scale prints from the original drawings, and this will lead to a considerable saving in blue print material. In a particular case, quoted by the author, the saving on this head alone amounted to over 10,000 dollars, which practically wiped out the difference in first cost between the photo projection and X-ray contact outfits (19,000 and 9,000 dollars respectively).

Formulas for the Skin Effect. (H. A. Wheeler, Procs. I.R.E., Vol. 30, No. 9, Sept., 1942, pp. 412-424.) (108/52 U.S.A.)

At radio frequencies, the penetration of currents and magnetic fields into the surface of conductors is governed by the skin effect. Many formulas are simplified if expressed in terms of the " depth of penetration," which has merely the dimension of length but involves the frequency and the conductivity and permeability of the conductive material. Another useful parameter is the "surface resistivity " determined by the skin effect, which has simply the dimension of resistance. These parameters are given for representative metals by a convenient chart covering a wide range of frequency. The " incremental-inductance rule " is given for determining not only the effective resistance of a circuit but also the

added resistance caused by conductors in the neighbourhood of the circuit. Simple formulas are given for the resistance of wires, transmission lines, and coils; for the shielding effect of sheet metal; for the resistance caused by a plane or cylindrical shield near a coil; and for the properties of a transformer with a laminated iron core.

A New Direct Crystal-Controlled Oscillator for Ultra-Short Wave Frequencies. (W. P. Mason, Procs. I.R.E., Vol. 30, Oct., 1942, pp. 464-472.) (108/53 U.S.A.)

An ultra-high-frequency crystal oscillator is described which utilizes a mechanical harmonic of an AT or BT crystal. With the oscillator frequencies as high as 197 megacycles, harmonics as high as the 23rd have been excited. Taking the second electrical harmonic of the oscillator, frequencies as high as 300 megacycles, or 1 meter have been obtained. Since a mechanical harmonic is used, the crystal can be of a practical size to handle and adjust. The harmonic vibration of the AT and BT crystals have as low a temperature coefficient as the fundamental mode, and temperature coefficients of less than two parts per million per degree centigrade are easily obtained. Stability curves for this type of oscillator are shown and the results indicate that at 120 megacycles stabilities in the same order of magnitude as for ordinary crystal oscillators can be obtained. Without temperature or voltage control it appears likely that the frequency should remain constant to ± 0.0025 per cent.

Some measurements have been made of the properties of harmonic crystals at high frequencies. It was found that the Q of a crystal is independent of the frequency but in general increases with harmonic order. The ratio of capacitances r of a crystal increases as the square of the harmonic order. It is shown that in order to obtain a positive reactance in the crystal $Q > 2r$. This relation will only be satisfied for harmonics of AT crystals less than the 7th. As a result oscillator circuits such as the Pierce circuit cannot be used to drive crystals at high harmonic frequencies. A discussion of oscillator circuits is given and it is shown that a capacitance-bridge oscillator circuit with the crystal in one arm is the best type to use for high-frequency harmonic crystals.

Magnetic Balance for the Inspection of Austenitic Steel. (R. L. Sanford, Bureau of Standards, Journal of Research, Vol. 10, 1933, pp. 321-326.) (108/54 U.S.A.)

The gamma phase of iron is non-magnetic. In ordinary carbon steels, this phase is only stable at high temperatures. In the presence of Cr and Ni, however, stability of the gamma phase persists to ordinary temperatures causing the low magnetic permeability to such " stainless " steels ($\mu \sim 2$).

As corrosion tests of these materials are rather tedious, the author suggests direct measurement of magnetic permeability as providing an index for corrosion resistance.

For this purpose a single form of magnetic balance is described which consists of a pair of permanent magnet bars, each 5 cm. long and 5 mm. diameter placed end to end and pivoted about an axis passing through the c.g. of the assembly (astatic mounting).

One of the free poles has a spherical end which is placed in contact with the materials under test (magnetizing force $\sim$800 œrsted) and the force required for separation is measured on a phosphor bronze helical spring (torsion balance).

The force as registered on a dial can be directly converted into permeability by calibrating the instrument with a magnetic material of known characteristics.

For routine inspection a fixed spring tension is probably the most satisfactory.

New Magnetic Materials. (W. E. Ruder, Procs. I.R.E., Vol. 30, No. 10, Oct., 1942, pp. 437-440.) (108/55 U.S.A.)

With the rapid growth of the radio and communication industry, a need for magnetic materials having special properties for this particular application has

developed. A number of nickel-iron alloys, such as permalloy, nicaloi, Mu Metal, and variations of these have found wide application as they all have the common property of high permeability at relatively low inductions. Where high resistivity also is desired, additional alloying elements, such as chromium and molybdenum, have been added. Complete freedom from strain, either mechanical or chemical, is necessary for good magnetic quality, and the strain set up by magnetization can be compensated for in many cases by heat treatment in a magnetic field. Silicon-iron alloys and some of the nickel-iron alloys can be very much improved by a combination of cold-rolling and heat treatment which induces a high degree of preferred orientation. This cold-rolled strip has found wide application in various types of electrical apparatus.

Permanent-magnet alloys of the alnico type have been very greatly improved recently so that the external energy factor (BHmax) is now about three times what it was in the best alnico heretofore available. Comparative data on the different types of permanent-magnet steels and alloys are given, and the new material should find wide application in the radio field. Considerable saving in material and size and weight of apparatus can be made by the application of these outstanding recent developments in magnetic materials provided suitable changes in design are made to allow for the most economical use.

Compressed Powder Magnets with Synthetic Resin Binder. (H. Dehler, Stahl und Eisen, Vol. 62, No. 47, 19/11/42, pp. 983-986.) (108/56 Germany.)

Permanent magnet alloys of the Fe-Ni-Al type are glass hard and very brittle. They cannot be forged or rolled and the only machining operation possible is that of grinding. The casting of such alloys is also difficult, especially if small holes have to be provided for fitting pole pieces or other attachments. For this reason, powder magnets in which the material is compacted by sintering, have been in use for some time.

As an alternative, the author describes a method of compacting by means of a resin binder (about 6 per cent. of phenol or polyvinychloride). By suitably grading the powdered alloy (*e.g.*, 50 per cent. 1 mm., 20 per cent. .3 mm. and 30 per cent. .05 mm. grain size) the density of the compact is of the order of 90 per cent. of the original alloy density. Compacting pressure ~1000 atmospheres, hardening temperature ~180° C.) This method of compacting enables the ready inspection of fittings or the provision of fine holes. The moulded product comes out true to size and no subsequent machining is necessary. The new process thus lends itself admirably to mass production and the saving in man hours is very considerable.

The magnetic qualities of such powder magnets are within 20 per cent. of the corresponding values for the cast material.

It is interesting to note that the new process also enables the production of magnetic filaments by extrusion. Finally by adopting appropriate binders, a magnetic paste or paint can be obtained which has proved useful when additional magnetic fields have to be provided in any arbitrary locality.

Ophthalmic Aspects of Acute Oxygen Deficiency. (R. A. McFarland, J. N. Evans and M. H. Halperin, Arch. Ophthalmology, 1941, Nov., Vol. 26, No. 5, pp. 886-913, 7 Figs. (71 Refs.) (108/57 Great Britain.)

After an introduction dealing with the general physiological changes in the human body when deprived of oxygen through the medium of the low pressure chamber, the authors describe the visual effects which may be anticipated.

The first systematic studies were made by Wilmers and Berens in 1918, the tests being carried out upon flying personnel. In the present study the authors have found that light minimum is impaired, as is also dark adaptation. Visual acuity, including the reactions of photopic vision, was found to be decreased in

dim light and unaffected in bright light under conditions corresponding to an altitude of 18,000 feet. With regard to the central field of vision, tests were carried out with the angioscotometer. Here it was found that the field was decreased owing to the widening of the angioscotoma. A study of colour vision revealed that this was further impaired if a defect already existed. The latent period of after-images was prolonged and the diameter of the arteries and veins increased slightly.

The authors found with regard to the extraocular muscles that any weakness became exaggerated, the range of action decreased and the co-ordinated ocular movements, such as those in reading, were less orderly. Latent defects became apparent.

They mention the influence of visual reactions of this character upon modern warfare in the air and stress that definite strategic advantage may be obtained by a more thorough knowledge of visual acuity and night vision at high altitudes. Oxygen is so basic a substance in biological functions that the ocular effects of anoxaemia cannot fail to reveal important data for the opthalmologist.

Effects of Highly Concentrated Oxygen on the Organism. (H. Becker-Freyseng, Verhandl. d. deut. Gesellsch. f. Kreislaufforsch., 1940, Vol. 13, pp. 83-85.) (108/58 Germany.)

According to Becker-Freyseng, the same concentrations of oxygen act differently on various types of animals. In a chamber of 40 cubic metres with normal moisture content, temperature, carbon dioxide content and air movement, but with an oxygen concentration of 80 to 90 per cent. and a barometric pressure of 76 cm. of mercury, mice, rats and dogs survived for eight days. Guinea pigs, however, were all dead at the end of four days. Albinotic rabbits died in three to four days, while pigmented ones survived for six or seven days or recovered after the experiment. Some died shortly after being removed from the high oxygen concentration.

The varying behaviour of the different types of animals indicated the necessity of caution in using human subjects.

The author and an associate remained for three days in an atmosphere containing 90 per cent. oxygen. During the first twenty-four hours no changes were observed but from then on, nervous disturbances (particularly paresthesias) were noticed. Bronchitis developed in one of the two investigators.

The author concludes from this that oxygen inhalation at altitudes over 4,000 meters is entirely without danger for the length of time aviators remain at these altitudes, the more so, since the partial pressure of the oxygen, as the result of the low total pressure, is normal even with a high oxygen concentration.

On the Neurologic and Characterlogic Assessment of Flying Fitness. (A Study Based on the Medical Examination of 2,000 Flying Candidates.) (R. Lemke, Luftfahrtmedizin, Vol. 3, No. 2, 1938-9, pp. 73-81.) (108/59 Germany.)

This paper stresses the importance of neurology and medical psychology in the selection of pilots. The mental strain involved in flying makes it imperative to select those candidates who are both mentally stable and reliable in character. The lack of reliable test methods for assessing character add enormously to the difficulties of the medical officers responsible for pilot selection.

The author reviews the medical histories of 2,000 flying candidates of an average age of 20. Of this number only 101 candidates were rejected as unfit, 104 were retained for further observation and the remainder were passed as fit. The candidates were placed in their respective body-build groups, were medically examined for epilepsy and other mental disorders and were interviewed by the psychiatrist. The past medical history of each candidate was carefully considered in order to detect possible latent tendencies of mental instability which might later manifest themselves under the strain of flying conditions. In

addition the candidates were given a general knowledge test. In this connection 43 candidates failed to reach the required standard and were rejected.

In spite of the painstaking care taken in the selection of pilots, the author emphasises the difficulties in assessing temperamental suitability and concludes that wherever possible doubtful cases should be kept under observation.

The Capacity of the Human Organism to Endure Centrifugal Forces in the Direction of Back to Chest. (O. Gauer and S. Ruff, Luftfahrtmedizin, Vol. 3, No. 2, 1938-9, pp. 225-230.) (108/60 Germany.)

Tests showed that the human organism can tolerate for a period of over 3 seconds centrifugal forces of the order of at least 8-10 g. when the direction of these forces moves from back to chest. The physiological effects were found to be so slight that the authors consider it possible to increase this limit substantially particularly over short periods. Even over longer periods with centrifugal forces exceeding 8 g. the only injury manifested were petechial hæmorrhages in the eye which, however, disappeared after two days.

The amount of "g" that can be tolerated by the human organism is also shown to be largely dependent on the nature of the support provided for the body and the type of device employed for keeping the head in position.

Changes in the Optical Reaction Time in Human Beings Subjected to High Centrifugal Forces. (H. Burmeister, Luftfahrtmedizin, Vol. 3, No. 2, 1938-9, pp. 277-284.) (108/61 Germany.)

Seventeen tests were carried out on eight subjects in order to determine the changes in optical reaction time under various degrees of acceleration on the centrifuge. This "reaction time" was measured by the time taken by the subject in response to a light signal to pull back an iron rod functioning like a control column.

When the centrifugal forces acted in a chest to back direction a slight prolongation of reaction time was observed in the case of five subjects when subjected to an acceleration of 4 g. This slowing up of reaction time was most pronounced at an acceleration of 8 g.

When the centrifugal forces acted in a head to seat direction, a slowing up of reaction time occurred even at 3 g. At 4.5 g. the change in reaction time was very pronounced, the subject showing symptoms of "black-out."

On the Use of Stimulants to Promote Gaseous Exchange in the Body Under Condition of Work at Low Pressure. (A. Rühl, W. Kühn and G. Müller, Luftfahrtmedizin, Vol. 3, No. 2, 1938-9, pp. 285-301.) (108/62 Germany.)

This paper deals with the problem of reducing the oxygen "debt" that is set up in the oxygen supply of the blood at low atmospheric pressure.

It is shown that cardiazol and coramin when injected into the body are effective in raising the reduced blood-pressure but scarcely have any effect on reducing respiratory difficulties. On the other hand it is shown that CO_2 has a decided therapeutic value as demonstrated by the results obtained for the various tests carried out in the low compression chamber. The advantages and disadvantages of CO_2 breathing are discussed. (Accurate metering is a difficulty.)

Oxygen Requirements at High Altitudes. (W. A. Wildhack, J. Aeron. Sci., Vol. 9, No. 14, December, 1942, pp. 543-547.) (108/63 U.S.A.)

Theoretical equations are developed to determine what concentrations of oxygen must be breathed at any altitude to maintain the "oxygen equivalent" of air at given altitudes—i.e. the same alveolar oxygen pressure. The partial pressures

of water vapour and carbon dioxide are taken into account, as well as the variation of the pressure of carbon dioxide with the alveolar oxygen pressure.

Six curves are given on a chart showing the oxygen concentrations required at any altitude to maintain the oxygen equivalent of air at sea level and at altitudes of 5,000, 10,000, 15,000, 20,000 and 25,000 feet. Altitudes of 33,800, 40,000 and 46,000 feet with pure oxygen are equivalent to air at sea level, 10,000 and 20,000 feet respectively.

It is shown that these equivalents are nearly independent of the assumptions as to the state of physiological adaptation (acclimatisation) and should be applicable to all individuals.

Safety in any particular case will, however, depend enormously on the acclimatisation of the individual at the lower altitude. Thus, if the pilot is very near collapse at 20,000 feet, he will be in the same danger with 100 per cent. O_2 at 46,000 feet. If on the other hand, he is acclimatised to 20,000 feet (mainly by increased breathing volume) his alveolar oxygen pressure will be 37 mm. Hg against the danger limit of 21 mm. of the non-acclimatised subject. He will thus still have considerable reserves in hand at 46,000 feet with 100 per cent. O_2 and under favourable conditions may ascend to 49,000 feet without danger of collapse. It is interesting to note that the altitude record without pressure suit is of this order (Doneti, Italy, 47,360 feet).

At such great altitude, the lung ventilation is already at a maximum and the breathing of CO_2 mixtures is of doubtful value and may even be harmful. (At lower altitudes, CO_2 mixture are beneficial by improving the ventilation.)

In conclusion it may be emphasised that the author only considers oxygen want and that pressure effects leading to aeroembolism (liberation of dissolved gas in the blood stream) are neglected.

The Method of Thin Films for the Study of Intermetallic Diffusion and Chemical Reactions at Metallic Surfaces. (H. S. Coleman, 24th Annual Convention of the A.S.M., Oct., 1942.) (Preprint No. 17.) (108/64 U.S.A.)

A simple method for observing intermetallic diffusion rates has been devised. This method involves the deposition from the vapour phase first of one metal then another on top of it. A microscope slide is used as a film base. The diffusion rates are then observed at various temperatures. This is done by noting the change in reflectivity at one surface as the metals diffuse.

The apparatus consists essentially of a car headlight source maintained at constant voltage, the bi-metallic reflecting film, and a photronic cell connected to a recording microammeter. The recorder draws a record of the change in reflectivity automatically as the diffusion progresses.

This new method makes possible the study of diffusion rates of metals through metals and, in some cases, gases through metals at temperatures as low as 50 degrees Cent. and in lengths of time as little as five minutes, depending upon the metals involved, the thickness of the metals, and the temperatures.

The activation energies determined by the method of thin films are in agreement with values obtained by others. For example, the activation energy for the diffusion of gold into lead has been found to be 13700 ± 300 calories.

Development and Performance of a Coal-Fired Unit Heater. (R. M. Rush, A.S.M.E., Dec. Meeting, 1942.) (108/65 U.S.A.)

The paper describes an advanced design of coal-fired unit heater; explains the means by which high rates of heat transfer comparable to those of heating boilers are attained in an air heater, and by which the steel shell of the combustion chamber is kept at a safe temperature level; and gives results of tests of a large heater of this type. Various modifications of the installation arrangements are described, and the savings of critical materials and of man-hours, important under the present war conditions, attainable by the use of this type of heater

are pointed out. A design of heater having all-refractory heat-transmitting surfaces, is also described. The reasons why the over-all savings of metal effected by the last-mentioned design must be disappointingly small, are explained.

A Brief Account of Modern Kinematics. (A. E. Richard de Jonge, Annual Meeting of the A.S.M.E., Nov. 30th-Dec. 4th, 1942.) (Preprint, Power Division, No. 23.) (108/66 U.S.A.)

The author has attempted to show what the various problems of plane kinematics are and how they have been approached and solved by simple means so as to make modern plane kinematics a usable tool, not for the mathematician or kinematician, but for the practical engineer. In this respect, the elements of a simple universally usable terminology are given, and the various branches of plane kinematics have been reviewed briefly to give the uninitiated an idea of the great simplicity of the modern methods. Quantitative kinematic synthesis has been presented briefly to the English-speaking engineer for the first time. A few remarks on the graphical methods used in space kinematics are added.

Aeroplanes Fit to Fight. (*American Opinion on the World's Best Military Aircraft.*) (N. F. Silsbee, Mech. Engg., Vol. 64, No. 12, Dec., 1942, pp. 847-852.) (108/68 U.S.A.)

The author's selection of the world's best aeroplanes is given below:—

CLASS	DESIGNATION
Heavy Bombers	Fortress (B-17F).
	Liberator (B-24E).
	Lancaster.
Medium Bombers	Mitchell (B-25).
	Martin (B-26).
	Dornier (217E-2).
Light Bomber	Havoc (A-20).
Landbased Torpedo Bomber ...	Martin (B-26).
	Savoia-Marchetti (SM.84).
Naval Torpedo Bomber	Grumman Avenger.
Naval Dive Bomber	Dauntless (SBD), Helldiver (SB2C).
Naval Patrol Bomber	Coronado (PY2Y).
Army Scout	Mustang (P-51).
Single-seater Fighter Interceptor	Spitfire IX, Focke Wulf 290.
	Typhoon, Lightning (P-38G).
High Altitude	Me. 109G, Thunderbolt (P-47D).
All Purpose	Hurricane II, Warhawk (P-40F).
Naval	Wildcat (F4F-4), Corsair (F4U-1).
Night Fighter	Beaufighter II, Havoc (DB7-B).
Transport Seaplane	Clipper 314A.
Transport Landplane	Commando C-46.
	Sky Master C-54.

It will be noted that the Axis powers are only credited with outstanding designs in three classes, i.e.:

Medium bomber, Dornier 217E-2.
Landbased torpedo bomber, SM 84.
Interceptor fighter, F.W.290.
High altitude fighter, Me 109G.

Metal-Spraying of Fabrics. (M. W. Schoop and C. H. Daeschle, Handbook of Metal-Spraying, Zürich, 1935, pp. 148-151.) (108/69 Switzerland.)

The authors suggest the use of metallised fabric for the medical practice of diathermy. This metallised fabric can be applied directly to the body and

enables the electric current to pass over the metallised surface to the affected part requiring diathermic treatment.

The metal spraying is carried out by the Schoop pistol and the material on which the heated metal is applied may be of linen, flannel, fine muslin or gauze. These materials when treated in this manner are perfectly pliable, possess good strength properties, the fibres being in no way affected by the heat of the liquid metal. The metal coating can be so finely applied as to make little difference to the weight of the material. Thus there was only a 12 gr. difference in weight after metallising both sides of a bandage 5 cm. wide and 5 m. long

According to the authors the metal coating showed no signs of brittleness even after bending or rubbing, the union with the fibre of the material apparently being complete. It was noticed, however, that frequent washing in soapy water affected the electrical conductivity of the material. This was explained by the fact that the fibre tends to swell thereby detaching the adhering metallic particles.

LIST OF SELECTED TRANSLATIONS.

No. 53.

NOTE.—Applications for the loan of copies of translations mentioned below should be addressed to the Secretary (R.T.P.3), Ministry of Aircraft Production, and not to the Royal Aeronautical Society. Copies will be loaned as far as availability of stocks permits. Suggestions concerning new translations will be considered in relation to general interest and facilities available.

Lists of selected translations have appeared in this publication since September, 1938.

THEORY AND PRACTICE OF WARFARE.

TRANSLATION NUMBER AND AUTHOR.	TITLE AND REFERENCE.
1652 ——	*Diving Brake of the Ju. 87 Dive Bomber.* (Flugsport, Vol. 34, No. 14, 8/7/42, pp. 218-220.)
1656 Sauer, R. ... ... Posch, H.	*The Adams Integration Process Applied to Ballistics.* (Ing. Archiv., Vol. 12, No. 3, June, 1941, pp. 158-168.)
1657 Muhlemann, E. ...	*Effect of Increase in Drag Due to Compressibility on the Tactical Employment of Aircraft.* (Flugwehr und Technik, Vol. 4, No. 8, August, 1942, pp. 208-210.)
1658 Belleroche, P. ...	*New Type of Military Aircraft on the Russo-German Front.* (La Science et la Vie, No. 300, August, 1942, pp. 89-93.)

AERO AND HYDRODYNAMICS.

1642 Ringleb, F. ...	*The Differential Equations of an Adiabatic Gas Flow and a Flow Shock.* (Deutsche Mathematik, Vol. 5, No. 5, January, 1941, pp. 377-384.)
1651 Kucharski	*Positions of Discontinuity in a Moving Continuum.* (Z.A.M.M., Vol. 21, No. 3, June, 1941, pp. 152-161.)
1653 Schmidt, W. ...	*Turbulent Propagation of a Stream of Heated Air, Pt. I.* (Z.A.M.M., Vol. 21, No. 5, Oct., 1941, pp. 265-278.)

Translation Number and Author.		Title and Reference.
1670	Schmidt, W. ...	*Turbulent Propagation of a Stream of Heated Air Pt. II.* (Z.A.M.M., Vol. 21, No. 6, December 1941, pp. 351-363.)
		Engines and Accessories.
1644	Null, v d W. ...	*Some Considerations on the Maximum Pressure Head of Single Stage Radial Aero Engine Superchargers.* (Luftwissen, Vol. 7, No. 5, May 1940, pp. 170-180.)
1661	Schering, H. Vieweg, R.	*Electrical Methods Applied to the Problem of Bearing Lubrication.* (Zeit. f. ange. Chemie, Vol. 39, 1936, pp. 1,119-1,123.)
1669	Gosslau, F. ...	*Development of High Duty Pistons Based on Modern Researches on Heat Flow.* (A.T.Z. Vol. 44, No. 24, 20/12/41, pp. 613-617.)
		Aircraft and Airscrews.
1646	——	*Retractable Aircraft Undercarriage with Emergency Release Gear.* (*German Patent No.* 719,357.) (Flugsport, Vol. 34, No. 9, 29/4/42, p. 115.)
1647	——	*Retractable Aircraft Undercarriage.* (*German Patent No.* 719,358.) (Flugsport, Vol. 34, No. 9, 29/4/42, p. 115.)
1648	——	*Retracting Strut for Aircraft.* (*German Patent No.* 719,409.) (Flugsport, Vol. 34, No. 9, 29/4/42, p. 115.)
1649	——	*Locking Device for Pressure Operated Aircraft Retracting Struts.* (*German Patent No.* 719,410.) (Flugsport, Vol. 34, No. 9, 29/4/42, p. 116.)
1650	——	*Locking Device for Pressure Operated Aircraft Retracting Struts.* (*German Patent No.* 719,411.) (Flugsport, Vol. 34, No. 9, 29/4/42, p. 116.)
1655	Doepp, v Ph. ...	*Polar Diagrams for Airscrew Design.* (L.F.F. Vol. 13, No. 2, February, 1936, pp. 46-56.)
1665	Reisberg, G. Rosler, E.	*Development of Electrical Lighting in Aircraft.* (Luftwissen, Vol. 8, No. 12, December, 1941, pp. 380-384.)
		Material and Elasticity.
1643	Opitz, H. ... ... Vito, W.	*The Performance of Emery Wheels as Affected by Coolants and Lubricants.* (Z.V.D.I., Vol. 86, No. 13-14, 4/4/42, p. 198.)
1660	Forster, F. ... ... Koster, W.	*The Modulus of Elasticity and Damping—Their Variation with the Condition of Materials.* (Z. f. Metallk., Vol. 29, No. 4, April, 1937, pp. 116-123.)
1663	Mienes, K.	*New Developments in the Fabrication and Application of Plastics.* (Kunststoffe, Vol. 32, No. 2, February, 1942, pp. 35-40.)

TRANSLATION NUMBER AND AUTHOR.	TITLE AND JOURNAL.
1668 Duffek, V.	*Anodic Deposition of Organic Dyes as a Means of Determining Pores and Mechanical Defects in the Surface Protection of Light Alloy.* (Z. f. Metallk., Vol. 30, No. 8, August, 1938, pp. 265-267.)
	INSTRUMENTS.
1643 Rein, H.	*Physical Methods for Determining Oxygen Concentration.* (Schrift d. L. Akad. f. Luftfahrtforschung, No. 11, 1939, pp. 1-7.)

TITLES AND REFERENCES OF ARTICLES AND PAPERS SELECTED FROM PUBLICATIONS REVIEWED IN R.T.P.3.

Requests for further information or translations should be addressed to R.T.P.3, Ministry of Aircraft Production.

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30	7091	U.S.A.	...	*Douglas B. 19 Four-Engined Bomber.* (Flugsport, Vol. 37, No. 22, 28/10/42, pp. 328-329.)

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31	7126	G.B.	...	*De Havilland Mosquito (Photograph).* (Aeroplane, Vol. 63, No. 1,647, 18/12/42, p. 694.)
32	7129	G.B.	...	*New Model of Spitfire (Photograph).* (Aeroplane, Vol. 63, No. 1,647, 18/12/42, pp. 696, 697, 716.)
33	7130	G.B.	...	*Bristol Bisley (Blenheim V Modified for Support Work with Ground Troops).* (Aeroplane, Vol. 63, No. 1,647, 18/12/42, p. 697.)
34	7131	Italy	...	*Piaggia P. 108B Heavy Bomber (Drawing).* (Aeroplane, Vol. 63, No. 1,647, 18/12/42, p. 698.)
35	7132	Germany	...	*Ju. 88 Bomber and Night Fighter (Photograph).* (Aeroplane, Vol. 63, No. 1,647, 18/12/42, p. 698.)
36	7133	G.B.	...	*Supermarine "Sea Fighter" (Photo).* (Aeroplane, Vol. 63, No. 1,647, 18/12/42, p. 700.)
37	7137	U.S.A.	...	*Fairchild Argus I (Recognition Details).* (Aeroplane, Vol. 63, No. 1,647, 18/12/42, p. 710.)
38	7138	U.S.A.	...	*Stinson Reliant I (Recognition Details).* (Aeroplane, Vol. 63, No. 1,647, 18/12/42, p. 711.)
39	7258	G.B.	...	*De Havilland Mosquito (Photographs and Recognition Details).* (Flight, Vol. 42, No. 1,773, 17/12/42, pp. 650-651 and a.)
40	7263	G.B.	...	*Blackburn Botha (Recog. Details).* (Flight, Vol. 42, No. 1,773, 17/12/42, p. b.)
41	7265	U.S.A.	...	*Lockheed Lightning Fighter (Photo).* (Flight, Vol. 42, No. 1,773, 17/12/42, p. 671.)
42	7268	U.S.A.	...	*Lockheed Ventura Bomber (Photo).* (Flight, Vol. 42, No. 1,773, 17/12/42, p. 670.)
43	7269	G.B.	...	*Airspeed Oxford V Trainer (Recog. Details).* (Aeroplane, Vol. 63, No. 1,645, 4/12/42, p. 638.)
44	7271	Germany	...	*Focke Wulf Kurier Transport (Photo).* (Aeroplane, Vol. 63, No. 1,645, 4/12/42, p. 642.)
45	7272	U.S.A.	...	*Grumman T.F.B. 1 Avenger Torpedo Bomber (Photo).* (Aeroplane, Vol. 63, No. 1,645, 4/12/42, p. 642.)
46	7275	U.S.A.	...	*Republic P. 47 Thunderbolt Fighter.* (Aeroplane, Vol. 63, No. 1,645, 4/12/42, p. 648.)
47	7276	G.B.	...	*Avro Anson I Trainer (Recog. Details).* (Aeroplane, Vol. 63, No. 1,645, 4/12/42, p. 655.)
48	7278	Germany	...	*Henschel 129 Ground Attack Aircraft.* (Flight, Vol. 42, No. 1,771, 3/12/42, p. 607.)
49	7282	G.B.	...	*Armstrong Whitworth Whitley (Recog. Details).* (Flight, Vol. 42, No. 1,771, 3/12/42, p. b.)
50	7283	G.B.	...	*Spitfires Above 40,000 Feet.* (Flight, Vol. 42, No. 1,771, 3/12/42, p. 612.)
51	7286	U.S.A.	...	*Nose of Lockheed "Lightning" (Photo of Guns).* (Flight, Vol. 42, No. 1,772, 10/12/42, p. 626.)
52	7287	U.S.A. and G.B.	...	*Mustang Army Corps Plane.* (F. Robertson, Flight, Vol. 42, No. 1,772, 10/12/42, pp. 627-630.)
53	7289	G.B.	...	*Bristol Blenheim IV and IV F. (Recog. Details).* (Flight, Vol. 42, No. 1,772, 10/12/42, p. a.)
54	7290	U.S.A.	...	*Martin Maryland (Recog. Details).* (Flight, Vol. 42, No. 1,772, 10/12/42, p. b.)
55	7291	Germany	...	*Blohm and Voss B.V. 222 Flying Boat (Drawing).* (Flight, Vol. 42, No. 1,772, 10/12/42, p. 633.)
56	7292	U.S.A.	...	*Aircraft Designation System Used by the U.S. Air Force.* (Flight, Vol. 42, No. 1,772, 10/12/42, p. 638.)

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57	7296	G.B.	...	*De Havilland 86B (Communication Plan) (Photo).* (Flight, Vol. 42, No. 1,772, 10/12/42, p. 647.)
58	7297	U.S.A.	...	*Vought Sikorsky F4U Shipboard Fighter "Corsair" (Photograph).* (Flight, Vol. 42, No. 1,772, 10/12/42, p. 648.)
59	7325	U.S.A.	...	*Republic Thunderbolt Fighter (Photo).* (Aeroplane, Vol. 63, No. 1,646, 11/12/42, p. 669.)
60	7326	Germany	...	*Junkers Ju. 87D. Dive Bomber (Photo).* (Aeroplane, Vol. 63, No. 1,646, 11/12/42, p. 671.)
61	7330	U.S.A.	...	*North American Mustang (Photo).* (Aeroplane, Vol. 63, No. 1,646, 11/12/46, p. 681.)
62	7332	U.S.S.R.	...	*T.B. 7 Four-Engined Heavy Bomber (Development of T.B. 6B).* (Flugsport, Vol. 34, No. 25, 9/12/42, pp. 389-390.)
63	7333	U.S.S.R.	...	*P.E. 2 Twin-Engined Dive Bomber.* (Flugsport, Vol. 34, No. 25, 9/12/42, pp. 390-391.)
64	7367	U.S.A.	...	*Curtiss "Seagull" Shipborne Observation Plane (Photo).* (U.S. Air Services, Vol. 27, No. 10, Oct., 1942, p. 18.)
65	7386	G.B.	...	*Mosquito (General Arrangement Drawing).* (Flight, Vol. 42, No. 1,774, 24/12/42, p. 683.)
66	7387	Italy	...	*Cant Z 1007 Bis Bomber (Alcione) (Recog. Details).* (Flight, Vol. 42, No. 1,774, 24/12/42, p. a.)
67	7388	G.B.	...	*Airspeed Oxford (Recog. Details).* (Flight, Vol. 42, No. 1,774, 24/12/42, p. b.)
68	7395	U.S.A.	...	*Curtiss SO3C-1 Seagull (Seamew in R.A.F.) Scout Observation Catapult Single Float (Photo).* (Aeroplane, Vol. 63, No. 1,648, 25/12/42, p. 724.)
69	7397	U.S.A.	...	*Douglas SDB-3 Dive Bomber (Photo).* (Aeroplane, Vol. 63, No. 1,648, 25/12/42, p. 726.)
70	7399	G.B.	...	*De Havilland Mosquito (Photo).* (Aeroplane, Vol. 63, No. 1,648, 25/12/42, pp. 734-735.)
71	7466	U.S.A.	...	*U.S. Army-Navy Basic Aircraft Type (Photo).* (A. I. Ennis and L. P. Lovetta, S.A.E.J., Vol. 50, No. 11, Nov., 1942, pp. 38-45.)
72	7483	G.B.	...	*De Havilland Mosquito (Photo).* (Aeroplane, Vol. 64, No. 1,649, 1/1/43, p. 2.)
73	7485	Germany	...	*Do. 217 E2 (Photo).* (Aeroplane, Vol. 64, No. 1,649, 1/1/43, p. 7.)
74	7487	G.B.	...	*Handley Page Harrow as a Troop Transport (Photo).* (Aeroplane, Vol. 64, No. 1,649, 1/1/43, p. 13.)
75	7489	U.S.A.	...	*North American "Mustang" (Recog. Details).* (Aeroplane, Vol. 64, No. 1,649, 1/1/43, p. 18.)
76	7490	Germany	...	*Messerschmitt Me. 109E (Recog. Details).* (Aeroplane, Vol. 64, No. 1,649, 1/1/43, p. 19.)
77	7491	G.B.	...	*New Model Spitfire (Photo).* (Aeroplane, Vol. 64, No. 1,649, 1/1/43, p. 23.)
78	7493	Japan	...	*Mitsubishi Navy OB-01 Bomber (Photo).* (Aeroplane, Vol. 64, No. 1,649, 1/1/43, p. 8.)
				Military Cargo and Transport Planes.
79	7203	U.S.A.	...	*Unloading Anti-Tank Gun from Troop Carrier (Photograph).* (Army Ordnance, Vol. 22, No. 135, Nov.-Dec., 1942, p. 492.)

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80	7264	G.B.	...	*Transport Aircraft (Past Achievements and Future Problems).* (W. Nichols, Flight, Vol. 42, No. 1,773, 17/12/42, pp. 664-667.)
81	7280	Various	...	*Air Freighters (German and Allied Requirements).* (E. N. Bentley, Flight, Vol. 42, No. 1,771, 3/12/42, p. 608.)
82	7281	U.S.A.	...	*Curtiss Commando Troop Carrier (C.W. 20) (Recog. Details).* (Flight, Vol. 42, No. 1,771, 3/12/42, p. a.)
83	7391	G.B.	...	*Transport Aircraft II (Assisted Take-off, Refuelling, etc.).* (W. Nicholls, Flight, Vol. 42, No. 1,774, 24/12/42, pp. 692-694.)
84	7481	France	...	*New French Transport Aircraft SO 30 and SO 31.* (Der Deutsche Sportflieger, Vol. 9, No. 8, Aug., 1942, p. 180.)
				Gliders.
85	6050	U.S.A.	...	*Two-Seater Plywood Plastic Glider.* (Am. Av., Vol. 6, No. 6, 15/8/42, p. 46.)
86	7055	U.S.A.	...	*Glider Pick-Up (Photographs).* (Aviation, Vol. 41, No. 8, Aug., 1942, p. 234.)
87	7128	G.B.	...	*Airspeed "Horsa" Glide (Photograph).* (Aeroplane, Vol. 63, No. 1,647, 18/12/42, pp. 695 and 703.)
88	7221	U.S.A.	...	*Gliders for War (including Pick-Up with Tug in Flight) (Illustrated).* (H. O. Johansen, Model Aeroplane News, Vol. 27, No. 4, Oct., 1942, pp. 6-7 and 63.)
89	7259	G.B.	...	*Horsa Glider (Photo).* (Flight, Vol. 42, No. 1,773, 17/12/42, p. 654.)
90	7279	Germany	...	*The Gotha Glider.* (Flight, Vol. 42, No. 1,771, 3/12/42, p. 607.)
91	7327	Germany	...	*German Troop Transport Gliders (Photo).* (Aeroplane, Vol. 63, No. 1,646, 11/12/42, p. 672.)
92	7479	Germany	...	*Auxiliary Motor for High Performance Gliders.* (Der Deutsche Sportflieger, Vol. 9, No. 8, Aug., 1942, p. 175.)
				Armament.
93	5967	G.B.	...	*Plastic Ammunition Rollers for Aircraft Machine Guns.* (British Plastics, Vol. 14, No. 162, Nov., 1942, p. 358.)
94	6051	U.S.A.	...	*Bomb Attachment for Consolidated P.B.Y. (Photo).* (Am. Av., Vol. 6, No. 6, 15/8/42, p. 50.)
95	7052	Germany	...	*Fire Power, Range and Gun Arcs of Do. 17, Ju. 88, Me. 110 and He. 111.* (Aviation, Vol. 41, No. 8, Aug., 1942, pp. 196-197.)
96	7081	Germany	...	*Four-Barrelled A.A. Gun Mounting (Photo).* (Flugsport, Vol. 34, No. 22, 28/10/42, p. 335.)
97	7084	Germany	...	*Gun Mounting for Rearward Fire (Pat. Series 40, No. 725,195).* (Messerschmitt, Flugsport, Vol. 34, No. 22, 28/10/42, pp. 161-162.)
98	7184	G.B.	...	*Plastic Fuse for Trench Mortars.* (British Plastics, Vol. 14, No. 163, Dec., 1942, pp. 418-419.)
99	7331	G.B.	...	*Effectiveness of Rear Fire.* (Aeroplane, Vol. 63, No. 1,646, 11/12/42, p. 690.)

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100	7337	Germany ...	*Gliding Bombs* (*Patent Series* 43, *No.* 726,969). (Hermann, Flugsport, Vol. 34, No. 25, 9/12/42, p. 173.)
101	7384	G.B.	*Bomb Loading on Mosquito* (*Photo*). (Flight, Vol. 42, No. 1,774, 24/12/42, p. 678.)
102	7395	Germany ...	*Bomb Stowage on Ju.* 88 (*Photo*). (Aeroplane, Vol. 63, No. 1,688, 25/12/42, p. 725.)
103	7396	G.B.	*Bomb Stowage on Mosquito* (*Photo*). (Aeroplane, Vol. 63, No. 1,648, 25/12/42, p. 726.)
104	7440	Switzerland ...	*Dive Bombing Attack*. (W. Guldimann, Flugwehr und Technik, Vol. 3, No. 5, May, 1941, pp. 103-109.)
105	7441	Switzerland ...	*Range and Bombing Efficiency of Aircraft* (*R.T.P. Trans.* 1,315). (R. Kassowitz, Flugwehr und Technik, Vol. 3, No. 5, May, 1941, pp. 107-109.)
106	7448	Germany ...	*Aircraft Guns, Examples of Early Installations* (1915-1917). (Luftwissen, Vol. 9, No. 9, Sept., 1942, pp. 275-276.)
107	7484	G.B.	*Ammunition Tracks for Tail Gun of Halifax* (*Photo*). (Aeroplane, Vol. 64, No. 1,649, 1/1/43, p. 5.)
			Aircraft Carriers.
108	7480	G.B.	*Combined Battleship and Aircraft Carrier* (*British Proposal*). (Der Deutsche Sportflieger, Vol. 9, No. 8, Aug., 1942, pp. 178-179.)
109	7488	G.B.	*Aircraft Carriers of the Combatants*. (Aeroplane, Vol. 64, No. 1,649, 1/1/43, pp. 14-17.)
			Design, Maintenance, Testing.
110	5983	G.B.	*Fundamentals of Fighter Design*. (F. H. M. Lloyd, J. Roy. Aeron. Soc., Vol. 46, No. 383, pp. 266-285.)
111	6086	G.B.	*Hand-Operated Lifting Jacks for Aeroplanes*. (Engineering, Vol. 154, No. 4,011, 27/11/42, p. 426.)
112	7322	G.B.	*Aircraft Testing During the War*. (Times Trade and Engineering, Vol. 52, No. 945, Nov., 1942, pp. 31-32.)
113	7336	Germany ...	*Heat Insulation for Pressure Cabins* (*Pat. Series* 43, *No.* 726,935). (Junkers, Flugsport, Vol. 34, No. 25, 9/12/42, p. 173.)
114	7342	Germany ...	*Snap Fastenings for Aircraft Cowlings* (*Pat. Series* 43, *No.* 726,758). (Heinkel, Flugsport, Vol. 35, No. 25, 9/12/42, p. 176.)
115	7366	U.S.A. ...	*Superiority of American Fighter Planes*. (E. Rickenbacker, U.S. Air Services, Vol. 27, No. 10, Oct., 1942, pp. 13-16.)
116	7368	U.S.A. ...	*Critics of American Aircraft—Aeronautical Chamber Reply*. (U.S. Air Services, Vol. 27, No. 10, Oct., 1942, p. 34.)
117	7400	G.B.	*On Serviceability* (*Maintenance at the Front*). (M. Gray, Aeroplane, Vol. 63, No. 1,638, 25/12/42, pp. 736-737.)
118	7450	Germany ...	*Washing of Parachutes*. (Der Adler, No. 22, 3/11/42, p. 687.)
119	7467	U.S.A. ...	*Aircraft Maintenance in North Africa*. (R. Toland, S.A.E.J., Vol. 50, No. 11, Nov., 1942, pp. 46-48.)

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120	7468	U.S.A.	...	*Aircraft Design and Combat Performances.* (N. F. Silsbee, S.A.E.J., Vol. 50, No. 11, Nov., 1942, pp. 495-496.)
				A.R.P.
121	6006	U.S.A.	...	*Laboratory Testing of Mg. Incendiary Bomb Extinguishers.* (M. Fleischer and J. J. Fahey, Ind. and Eng. Chem. (News Ed.), Vol. 20, No. 17, 10/9/42, p. 1,110.)
122	7012	G.B.	...	*Some Aspects of the Work of the Gas Identification Services.* (G. W. Ferguson, J. Institute of Chemistry, Pt. IV, Aug., 1942, pp. 166-178.)
123	7124	G.B.	...	*Civil Defence Against War Gases.* (Nature, Vol. 150, No. 3,814, 5/12/42, pp. 642-643.)
124	7195	G.B.	...	*Dennis No. 3 Two-Stage Centrifugal Pump (Trailer Fire Unit).* (Autom. Eng., Vol. 32, No. 431, Dec., 1942, pp. 511-517.)
125	7373	U.S.A.	...	*Air Raid Precautions for Chemical Firms.* (Ind. and Eng. Chem. (News Ed.), Vol. 20, No. 20, 25/10/42, p. 1,318.)
				Aero- and Hydrodynamics.
				Aerodynamics.
126	6058	Germany	...	*Aerodynamics of Aircraft Models (Aerofoil Measurements Covering Re 2,100-168,000) (Book Review).* (F. W. Schmitz, Flugsport, Vol. 34, No. 24, 25/11/42, p. 367.)
127	7139	Japan	...	*Application of the Hodograph Method to the Flow of a Compressible Fluid Past a Circular Cylinder.* (K. Tamada, Proc. of the Physico-Mathematical Society of Japan, Vol. 22, No. 3, March, 1940, pp. 208-219.)
128	7156	Germany	...	*Temperature in Shock Waves and Their Possible Connection with the Luminosity of Meteors.* (H. Muraour, Z.G.S.S., Vol. 37, No. 9, Sept., 1942, pp. 166-169.)
129	7442	G.B. and U.S.A.	...	*The Mutual Interferences Between Engine Nacelle and Wing (British and U.S.A. Investigations).* (E. Billeter, Flugwehr und Technik, Vol. 3, No. 5, May, 1941, pp. 107-109.)
130	7446	U.S.A.	...	*The Compressible Potential Flow Past Elliptic Symmetrical Cylinders at Zero Angle of Attack and with No Circulation.* (H. Wendt and W. Hantzsche, L.F.F., Vol. 18, No. 9, Sept. 20th, 1941, pp. 311-316. R.T.P. Trans. No. 1,354 and T.M. 1,030, Oct., 1942.)
131	7451	Germany	...	*Comparison of Various Methods for Determining Flight Speed at Great Altitudes.* (R. Schmidt, Luftwissen, Vol. 9, No. 9, Sept., 1942, pp. 270-275.)
132	7460	U.S.A.	...	*Wind Tunnel Investigation of Diving Brakes.* (D. Fuchs, L.F.F., Vol. 15, No. 1 and 2, 20/1/38, pp. 19-27. R.T.P. Trans. No. 670 and T.M. 1,023, Nov., 1942.)

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133	7520	G.B. ...	... *Diagrams for Calculation of Airfoil Lattices.* (*A. Betz, Ingenieur Archiv., Vol. 11, No. 3, Sept.*, 1931.) (*R.T.P. Translation T.M.* 1,022.)
			Hydrodynomics.
134	7433	G.B. ...	... *Theory of Stress Due to Collapse of Vapour Bubbles in a Liquid (Cavitation Erosion).* (R. S. Silver, Engineering, Vol. 154, No. 4,015, 25/12/42, pp. 501-502.)
135	7443	G.B. ...	... *Sea Waves (Water Movement).* P. S. H. Unna, Nature, Vol. 150, No. 3,811, 14/11/42, pp. 581-582.)
			Aircraft and Accessories.
			Design and Performance.
136	5975	G.B. ...	... *Timm Plastic/Wood Aircraft.* (British Plastics, Vol. 14, No. 162, Nov., 1942, pp. 336-337.)
137	6035	G.B. ...	... *Kinetic Energy in Partial Climbs and Effect on Performance Calculation.* (A. G. Hurn, Airc. Eng., Vol. 14, No. 165, Nov., 1942, p. 319.)
138	6048	U.S.A.	... *Flying Wing Developments.* (E. J. Foley, Am. Av., Vol. 6, No. 6, 15/8/42, pp. 34, 44, 46.)
139	7120	G.B. ...	... *Weight Reduction in Aeroplane by Use of Needle Bearings.* (R. H. White, Bearing Engineer, Vol. 2, No. 2, April, 1942, pp. 6 and 8.)
141	7192	G.B. ...	... *Laminated Paper Plastic for Airplane Wing Tips.* (British Plastics, Vol. 14, No. 163, Dec., 1942, pp. 404/406 and 422.)
142	7401	G.B. ...	... *The First Aeroplane.* (Aeroplane, Vol. 63, No. 1,648, 25/12/42, p. 746.)
143	7432	G.B. ...	... *Aeronautics in* 1942. (Engineer, Vol. 175, No. 4,538, 1/1/43, pp. 7-9.)
144	7392	G.B. ...	... *The First Aeroplane.* (B. Jablensky, Aeroplane, Vol. 64, No. 1,649, 1/1/43, p. 28.)
145	7465	U.S.A.	... *Flight Testing Equipment for Large Aircraft (Digest).* (W. T. Dickenson, S.A.E.J., Vol. 50, No. 11, Nov., 1942, pp. 37 and 60.)
			Airlines and Airport Operations.
146	6005	G.B. ...	... *Aerodrome Construction (Report of Select Committee on National Expenditure).* (Engineer, Vol. 174, No. 4,532, 20/11/42, p. 424.)
147	6034	G.B. ...	... *Air Line Engineering Management.* (I. Lusty, Airc. Eng., Vol. 14, No. 165, Nov., 1942, pp. 315-316.)
148	6096	G.B. ...	... *Drop Doors for Air Hangars.* (Aeronautics, Vol. 7, No. 5, Dec., 1942, p. 43.)
149	7016	G.B. ...	... *Aerodrome Abstract* (1942), *Vol. 1, No. 5 (Abstract* 76-95). (J. Inst. Civil Engs., Vol. 19, No. 1, Nov., 1942, pp. 10-16.)

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150	7041	U.S.A.	...	*The Future of Water Based Aeroplane (Part III.* (F. T. Courtney, Aviation, Vol. 41, No. 8, Aug., 1942, pp. 93-95 and 252.)
151	7047	U.S.A.	...	*Weight Control in Airline Operation,* (C. Froesch, Aviation, Vol. 41, No. 8, Aug., 1942, pp. 201-202 and 285.)
152	7328	U.S.A.	...	*Glenn Martin Flying Boat "Mars" (Photo).* (Aeroplane, Vol. 63, No. 1,646, 11/12/42, p. 675.)
153	7470	U.S.A.	...	*Fuel Consumption from the Airlines Viewpoint* (M. G. Beard, S.A.E.J., Vol. 50, No. 11, Nov., 1942, pp. 484-491.)
				Airscrews and Helicopters.
154	6059	Germany	...	*Airscrew Spinner Providing Hot Air Circulation Over the Hub (Pat. Series 42, No. 726,328).* (Junkers, Flugsport, Vol. 34, No. 24, 25/11/42, p. 169.)
155	6060	Germany	...	*Device for Simultaneous Automotive Pitch Control of Non-Coaxial Airscrews (Pat. Series 42, No. 725,100).* (Junkers, Flugsport, Vol. 34, No. 24, 25/11/42, pp. 169.)
156	6061	Germany	...	*Electrical Pitch Setting Indicator for Variable Pitch Airscrews (Pat. Series 42, No. 725,407).* (Siemens, Flugsport, Vol. 34, No. 24, 25/11/42, p. 170.)
157	6062	Germany	...	*Device for Synchronising Airscrew Speeds on Multi-Engined Aircraft by Means of a Magnetic Field Rotating at Constant Speeds (Pat. Series 42, No. 725,197).* (Seppeler, Flugsport, Vol. 34, No. 24, 25/11/42, pp. 170-171.)
158	6063	Germany	...	*Variable Pitch Airscrew (Operated by Air-Driven Rotor (Pat. Series 42, No. 725,853).* (Argus, Flugsport, Vol. 34, No. 24, 25/11/42, p. 171.)
159	6064	Germany	...	*Direction of Rotation of Airscrew Determined by Relative Position of Cockpit and Engine Nacelle in Unsymmetrical Aircraft (Pat. Series 42, No. 725,508).* (Blohm and Voss, Flugsport, Vol. 34, No. 24, 25/11/42, p. 172.)
160	7035	U.S.A.	...	*Steel Tube Airscrew Blades (American Prop. Corp.).* (Airc. Prod., Vol. 4, No. 49, Nov., 1942, p. 661.)
161	7102	G.B.	...	*Stress Measurement in Airscrew Blades.* (K. R. Boydell, Airc. Prod., Vol. 4, No. 50, Dec., 1942, pp. 687-689.)
162	7109	G.B.	...	*Hydulignum Airscrew Blades (Thermoplast Bond).* (Airc. Prod., Vol. 4, No. 50, Dec., 1942, p. 730.)
163	7261	U.S.A.	...	*Single Rotor Blade for Autogiros (U.S.A. Pat. No. 2,297,815).* (Flight, Vol. 42, No. 1,773, 17/12/42, p. 654.)
164	7274	G.B.	...	*Multi-Bladed Airscrews.* (A. V. Cleaver, Aeroplane, Vol. 63, No. 1,645, 4/12/42, pp. 648-649.)
165	7285	U.S.A.	...	*Sikorsky Amphibian Helicopter V.S. 300 (Photo).* (Flight, Vol. 42, No. 1,772, 10/12/42, p. 626.)
166	7323	G.B.	...	*Advances in Airscrew Design.* (Times Trade and Engineering, Vol. 52, No. 945, Nov., 1942, pp. 33-34.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
167	7343	Germany ...	*Automatic Blade Incidence for Helicopters to Ensure Constant Engine Torque* (*Pat. Series* 43, *No.* 726,978). (Focke, Flugsport, Vol. 34, No. 25, 9/12/42, p. 176.)
168	7482	France ...	*French Helicopter S.E.* 700. (Der Deutsche Sportflieger, Vol. 9, No. 8, Aug., 1942, p. 180.)
			Control Surface Operation (Patents).
169	6065	Germany ...	*Operation of Several Hand Pumps at Will by Means of a Single Operating Mechanism* (*Pat.* 42, *No.* 725,873). (Arado, Flugsport, Vol. 34, No. 24, 25/11/42, p. 172.)
170	7083	Germany ...	*Spoiler Flap (Combined with Air Ejector)* (*Pat. Series* 40, *No.* 725,194). (A.V.A. (Goettingen), Flugsport, Vol. 34, No. 32, 28/10/42, p. 161.)
171	7085	Germany ...	*Device for Transmission of Control Rods Through Attachments on Aircraft of the Quick Release Type* (*Pat. Series* 40, *No.* 725,306). (Henschel, Flugsport, Vol. 34, No. 22, 28/10/42.)
172	7086	Germany ...	*Application of Rotors to Obtain Lateral Control on Air or Marine Craft* (*Pat. Series* 40, *No.* 724,796). (Holst, Flugsport, Vol. 34, No. 22, 28/10/42, p. 162.)
173	7089	Germany ...	*Device for Automatically Locking Control Piston in Hydraulic or Pneumatic Circuits* (*Pat. Series* 40, *No.* 724,315). (V.D.M., Flugsport, Vol. 34, No. 22, 28/10/42, p. 164.)
174	7338	Germany ...	*Split Flap (Continued Air Brake and Landing Flap)* (*Pat. Series* 43, *No.* 726,492). (Heinkel, Flugsport Vol. 34, No. 25, 9/12/42, pp. 173-174.)
175	7339	Germany ...	*Foolproof Locking Device for Aircraft Control Surfaces* (*Pat. Series* 43, *No.* 726,648). (Junkers, Flugsport, Vol. 34, No. 25, 9/12/42, pp. 174-175.)
176	7340	Germany ...	*Landing Flap Control* (*Pat. Series* 43, *No.* 726,492). (Heinkel, Flugsport, Vol. 34, No. 25, 9/12/42, p. 174.)
177	7341	Germany ...	*Operation of Landing and Brake Flaps* (*Pat. Series* 43, *No.* 726,493). (Heinkel, Flugsport, Vol. 34, No. 25, 9/12/42, p. 174.)
178	7344	Germany ...	*Hydraulic Operation of Landing Flaps* (*Pat. Series* 43, *No.* 726,934). Teves, Flugsport, Vol. 34, No. 25, 9/12/42, p. 175.)
179	7390	U.S.A. ...	*Constant Tension Control Cables* (*U.S.A. Pat.* 2,298,611). (Flight, Vol. 42, No. 1,774, 24/12/42, p. 691.)
180	7392	G.B.	*Hydraulic Remote Controls* (*Messier*). (Flight, Vol. 42, No. 1,774, 24/12/42, p. 695.)
			Undercarriages.
181	7087	Germany ...	*Spring Mounting for Aircraft Wheels* (*Pat. Series* 40, *No.* 724,313). (V.D.M., Flugsport, Vol. 34, No. 22, 28/10/42, p. 163.)
182	7088	Germany ...	*Cover Plates for Retractable Undercarriage Recess* (*Pat. Series* 40, *No.* 723,664). (Henschel, Flugsport, Vol. 34, No. 22, 28/10/42, p. 163.)

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183	7090	Germany	...	*Device for Jettisoning of Certain Aircraft Parts such as Undercarriage* (*Pat. Series* 40, *No.* 722,627. (Fieseler, Flugsport, Vol. 34, No. 22, 28/10/42, p. 164.)
				Maintenance and Ground Equipment.
184	7547	G.B. ...	...	*Bibliography of Published Information* (*including Translations*) *on Maintenance and Ground Equipment.* (1, General; 2, Fuelling-up; 3, Electrical Equipment; 4, Hydraulic System.) (R.T.P. Bibliography No. 75, Nov., 1942, Ministry of Aircraft Production.)
				Engines and Accessories.
				Engine Types.
185	6031	G.B. ...	...	*Merlin XX Power Plant Installation.* (Airc. Eng., Vol. 41, No. 165, Nov., 1942, pp. 310-311.)
186	7046	Japan	...	*Design Details of Mitsubishi Kinsei Engine.* (W. G. Ovens, Aviation, Vol. 41, No. 8, Aug., 1942, pp. 110-117 and 270.)
187	7080	Germany	...	*Mercedes Benz Aircraft Aero Engines Since* 1888 (*Review of Types*). (Flugsport, Vol. 37, No. 22, 28/10/42, pp. 329-334.)
188	7105	G.B. ...	...	*Interchangeable Power Plants* (*Hercules and Merlin*). (Airc. Prod., Vol. 4, No. 50, Dec., 1942, pp. 705-706.)
189	7127	G.B. ...	...	*Merlin* 61 *Aero Engine.* (Aeroplane, Vol. 63, No. 1,647, 18/12/42, pp. 695-696 and 705-708.)
190	7135	G.B. ...	...	*Merlin XX* (*Sectional Drawing*). (Aeroplane, Vol. 63, No. 1,647, 18/12/42, pp. 706-707.)
191	7136	G.B. ...	...	*Merlin Engine Installations* (*Spitfire* 9, *Fairey Fulmar I, Wellington II, Halifax, Hurricane IIc, Kittyhawk II, Whitley V, Lancaster I*). (Aeroplane, Vol. 63, No. 1,647, 18/12/42, p. 709.)
192	7262	G.B. ...	...	*Rolls Royce Merlin* 61. (Flight, Vol. 42, No. 1,773, 17/12/42, pp. 655-659.)
193	7204	U.S.A.	...	*New Forged Cylinder Heads of Cyclone Engines.* (P. W. Brown, Army Ordnance, Vol. 22, No. 135, Nov.-Dec., 1942, pp. 518-521.)
194	7277	Germany	...	*German Radial Engines* (*B.M.W. Bramo Fafnir*). (Flight, Vol. 42, No. 1,771, 3/12/42, pp. 603-607.)
195	7311	G.B. ...	...	*Rolls Royce Merlin* 61 *Engine.* (Engineer, Vol. 174, No. 4,536, 18/12/42, pp. 495-497.)
196	7334	Germany	...	*Details of Automatic Control Unit of Ju.* 211 *Petrol Injection Engine.* (Flugsport, Vol. 34, No. 25, 9/12/42, pp. 391-395.)
197	7381	U.S.A.	...	*B.M.W.* 801*A Aero Engine.* (Autom. Ind., Vol. 87, No. 8, 15/10/42, pp. 20-24.)
198	7469	Germany	...	*Design Features of Junkers Ju.* 211*B Aircraft Engine* (*with Test Data on Injection Equipment and Supercharger*). (S. Oldberg and T. M. Ball, S.A.E.J. (Transaction), Vol. 50, No. 11, Nov., 1942, pp. 465-483.)

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199	6055	Germany ...	*Infinitely Variable Gear for Incorporation Between Governor and Fuel Pump Delivery (Pat. No.* 710,463). (Junkers, Flugsport, Vol. 34, No. 24, 25/11/42, pp. 358-359.)
			Turbines and Compressors.
200	7099	Germany ...	*Compressed Air Locomotive.* (Progressus, Vol. 7, No. 1, Jan., 1942, pp. 20-23.)
201	7294	G.B.	*Gas Turbine for Aircraft.* (A. Hudson, Flight, Vol. 42, No. 1,772, 10/12/42, p. 644.)
202	7295	G.B.	*Boost Pressure Variation with Engine Speed.* (F. Ashley, Flight, Vol. 42, No. 1,772, 10/12/42, p. 644.)
203	7393	G.B.	*Variation of Boost Pressure with Speed.* (L. S. Greenland, Flight, Vol. 42, No. 1,774, p. 698.)
204	7426	G.B.	*The First Gas Turbine Locomotive (Discussion).* (A. Meyer, Engineering, Vol. 155, No. 4,016, 1/1/43, pp. 15-16.)
205	7430	G.B.	*A New Rotary Compressor (Discussion).* (A. J. R. Lysholm, Engineering, Vol. 155, No. 4,016, 1/1/42, p. 16.)
206	7438	G.B.	*The First Gas Turbine Locomotive (with Discussion).* (A. Meyer, Engineering, Vol. 174, No. 4,537, 25/12/42, pp. 521-523 and 524-527.)
			Filters and Hoods.
207	7260	G.B.	*Warming Hood for Merlin 61 (Photo).* (Flight, Vol. 42, No. 1,773, 17/12/42, p. 654.)
208	7464	U.S.A. ...	*Requirements for Carburettor Air Filters for Aircraft Engines (Digest).* (W. D. Cannon, S.A.E.J., Vol. 50, No. 11, Nov., 1942, p. 37.)
			Testing.
209	7030	U.S.A. ...	*Aircraft Engine Testing by American Firms.* (Airc. Prod., Vol. 4, No. 49, November, 1942, pp. 635-636.)
210	7101	G.B.	*Recovery of Engine Power.* (Airc. Prod., Vol. 4, No. 50, Dec., 1942, p. 685.)
211	7182	U.S.A. ...	*Cold-Room Test Cells for Cyclone Engines.* (Trade Winds, Oct., 1942, pp. 8-9.)
			Piston, Cylinder Heads, and Bearings.
212	6078	G.B.	*Mechanism of Metallic Friction.* (Metal Industry, Vol. 61, No. 20, 13/11/42, p. 309.)
213	7078	Germany ...	*Frictional Losses in Ships' Propeller Shafts.* (W.R.H., Vol. 23, No. 7, 1/4/42, pp. 108-109.)
214	7118	Germany ...	*The Utilisation of Substitute Steels in the Construction of Mahle Composite Pistons.* (Aluminium, Vol. 24, No. 9, Sept., 1942, pp. 322-323.)
215	7202	U.S.A. ...	*Oil Engine Bearings (Materials).* (A. B. Willi, Autom. Eng., Vol. 32, No. 431, Dec., 1942, pp. 535-542.)
216	7404	U.S.A. ...	*Effect of Surface Roughness on Journals (from A.S.M.E.).* (R. W. Dayton and others, Mech. World, Vol. 112, No. 2,921, 25/12/42, pp. 601-603.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
217	7300	G.B. ...	... *The Physical Basis of Seizure.* (E. A. Smith, Engineering, Vol. 154, No. 4,014, 18/12/42, pp. 481-482.)
218	6022	U.S.A.	... *The Role of Surface Chemistry and Profile in Boundary Lubrication.* (J. T. Burwell, S.A.E.J., Vol. 50, No. 10, Oct., 1942, pp. 450-457.)
219	7121	G.B. ...	... *Seals for Anti-Friction Bearings (I).* (R. T. Dunlop, Bearing Engineer, Vol. 2, No. 3, June, 1942, pp. 3 and 8.)
220	7123	G.B. ...	... *Seals for Anti-Friction Bearings (II).* (R. T. Dunlop, Bearing Engineer, Vol. 2, No. 4, Aug., 1942, pp. 6 and 8.)

Fuels and Lubricants.

Knock Rating.

221	6023	U.S.A.	... 1941 *C.F.R. Road Detonation Tests.* (J. M. Campbell and others, Vol. 50, No. 10, Oct., 1942, pp. 458-464.)
222	7141	Germany	... *German Co-operative Fuel Research—Improvement in Method of Knock Research.* (Z.V.D.I., Vol. 86, No. 43-44, 31/10/42, pp. 651-652.)
223	7232	U.S.A.	... *Effect of Altitude on Knock Rating in C.F.R. Engine.* (D. B. Brooks, Bur. of Stands. J. Research, Vol. 28, No. 6.)

Oxidation and Combustion.

224	5984	G.B. ...	... *Catalysts—Ancient and Modern (with Special Reference to Microbiological Processes).* (A. J. V. Underwood, Chem. and Ind., Vol. 61, No. 47, 21/11/42, pp. 476-478.)
225	7167	U.S.S.R.	... *Thermal Theory of Combustion and Explosives.* (N. N. Semenov, Progress of Physical Science, U.S.S.R., Vol. 23, No. 3, 1940, pp. 251-292.) (R.T.P. Trans. No. T.M. 1,024.)
226	7168	U.S.S.R.	... *Self-Ignition and Combustion of Gases.* (A. S. Sokalic, Progress of Physical Science, U.S.S.R., Vol. 23, No. 3, 1940, pp. 209-250,) (R.T.P. Trans. No. T.M. 1,025.)
227	7375	U.S.A.	... *Ethylene Oxide Explosions (High Pressure Reactions).* (Ind. and Eng. Chem (News Ed.), Vol. 20, No. 20, 25/10/42, p. 1,318.)
228	7372	U.S.A.	... *Carbon Black Obtained from Gas Explosions (Natural Gas and Chlorine).* (Ind. and Eng. Chem. (News Ed.), Vol. 20, No. 20, 25/10/42, p. 1,317.)
229	7405	G.B. ...	... *Calcium Carbide Manufacture and Acetylene (Flow-sheet of Process).* (Mech. World, Vol. 112, No. 2,921, 25/12/42, pp. 609-610.)

Oil Testing and Recovery.

230	5964	U.S.A.	... *Oxidation Characteristics of Lubricating Oils (Stability and Chemical Composition).* G. H. von Fuchs and H. Diamond, Ind. and Eng. Chem (Ind. Ed.), Vol. 34, No. 8, Aug., 1942, pp. 927-937.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
231	6013	U.S.A. ...	*Determination of Water in Insulating Oil (Manometric Method).* (R. N. Evans and J. E. Davenort, Ind. and Eng. Chem. (Anal. Ed.), Vol. 14, No. 9, 15/9/42, pp. 732-733.)
232	6019	U.S.A. ...	*The Testing of Heavy Duty Motor Oils (with Discussion).* (H. C. Mougey and J. A. Moller, S.A.E.J., Vol. 50, No. 10, Oct., 1942, pp. 417-438.)
233	7201	G.B.	*Used Oil Recovery.* (Autom. Eng., Vol. 32, No. 431, Dec., 1942, p. 534.)
234	7306	G.B.	*Magnetic Filter for Lubricants.* (Engineering, Vol. 154, No. 4,013, 11/12/42, p. 466.)
235	7317	U.S.A. ...	*Extraction of Metallic Constituents from Used Lubricating Oils (Alternative to Ash Method).* (E. P. Rittershausen and R. T. De Gray, Ind. and Eng. Chem. (Anal. Ed.), Vol. 14, No. 10, 16/10/42, pp. 806-807.)
236	7453	U.S.A. ...	*Viscosity and Pole Height of Ubbelode.* (S. S. Kurtz, Ind. and Eng. Chem. (Ind. Ed.), Vol. 34, No. 6, June, 1942, p. 770.)
			Vapour Lock and Fire Risk.
237	7389	G.B.	*Vapour Lock During Rapid Ascent.* (D. C. Greenwood, Flight, Vol. 42, No. 1,774, 24/12/42, pp. 690-691.)
238	7454	U.S.A. ...	*Electrical Charge Produced by Flowing Petrol.* (S. S. Mackeown and V. Wouk, Ind. and Eng. Chem. (Ind. Ed.), Vol. 34, No. 6, June, 1942, pp. 659-664.)
239	7455	U.S.A. ...	*Guarding Against the Flammable Liquid Fire Hazard.* (C. L. Griffin, Ind. and Eng. Chem. (Ind. Ed.), Vol. 34, No. 6, June, 1942, pp. 664-669.)
			Liquid Fuels and Abstracts.
240	6018	U.S.A. ...	*Densities of Liquefied Gases (Propane Propylene, Isobutane, Pentane, etc.).* (Ind. and Eng. Chem. (Ind. Ed.), Vol. 34, No. 10, Oct., 1942, pp. 1,240-1,243.)
241	7065	G.B.	*Fuel Research Board (Abstracts).* (Summary for Two Weeks ending 21st and 28th, November.)
			Materials and Elasticity.
			Elastic Theory.
242	5958	U.S.A. ...	*Metal Powder Fillings as a Vibration Damper (Application to Electric Contacts).* (Sci. Am., Vol. 167, No. 5, Nov., 1942, p. 207.)
243	5985	U.S.A. ...	*Rectangular Plate Loaded Along Two Adjacent Edges by Couples in its Own Plane.* (W. R. Osgood, J. Res. Bur. of Stands., Vol. 28, No. 2, Feb., 1942, pp. 159-163.)
244	6030	G.B.	*Built-in and Continuous Beams.* (L. P. Dudley, Airc. Eng., Vol. 41, No. 165, Nov., 1942, pp. 306-309 and 319.)

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245	7013	G.B.	...	*A Model Illustrating Intercrystalline Boundaries and Plastic Flow in Metals.* (L. Bragg, Rev. of Scientific Insts., Vol. 19, No. 10, Oct., 1942, pp. 148-150.)
246	7018	G.B.	...	*Tensile Strength of Water and Liquid Structure Theory.* (R. S. Silver, Nature, Vol. 150, No. 3,812, 21/11/42, p. 605.)
248	7176	U.S.A.	...	*Method of Exciting Resonant Vibrations in Mechanical Systems.* (L. B. Tuckerman, Bureau of Standards Journal of Research, Vol. 10, 1933, p. 659.)
249	7181	U.S.A.	...	*Determination of Stresses from Strains on Three Intersecting Gauge Lines.* (W. R. Osgood and D. W. Querfeld, Bureau of Standards Journal of Research, Vol. 10, 1933, pp. 615-692.)
250	7231	U.S.A.	...	*Perforated Cover Plates for Steel Columns.* (A. H. Stang and M. Greenspan, Bur. Stands. J. Res., Vol. 28, No. 6, June, 1942, pp. 669-712.)
251	7345	Germany	...	*Comparative Strength of Materials (III) (Design Data for Replacement of Materials in a Given Structure).* (P. Schwerber, Aluminium, Vol. 24, No. 11, Nov., 1942, pp. 377-381.)
252	7355	U.S.S.R.	...	*Metal Research in the U.S.S.R. (Hardness and Plasticity).* (Metal Industry, Vol. 61, No. 24, 11/12/42, p. 380.)
253	7403	G.B.	...	*Vibration of Presses.* (Mech. World, Vol. 112, No. 2,921, 25/12/42, p. 612.) .
				Iron and Steel.
255	5980	U.S.A.	...	*Elastic Properties of Some Alloy Cast Irons.* (A. I. Krynitsky and C. M. Saager, Vol. 28, No. 1, Jan., 1942, pp. 73-93.)
256	5993	U.S.A.	...	*Tensile Elastic Properties of Nickel, Copper, Open-Hearth Iron and Typical Steels (R.P. 1,459).* (D. J. McAdam and R. W. Mebs, J. Res. Bur. Stands., Vol. 28, No. 3, March, 1942, pp. 379-400.)
257	6003	G.B.	...	*Sponge Iron Process.* (Engineer, Vol. 174, No. 4,532, 20/11/42, p. 417.)
258	6080	U.S.A.	...	*Creep Rates of Cold Drawn Ni.-Cu. Alloy (Monel).* (P. A. Bennett and D. J. McAdam, J. Res. Bureau of Stands., Vol. 28, No. 4, April, 1942, pp. 417-437.)
259	6083	U.S.A.	...	*Tensile and Compressive Properties of Some Stainless Steel Sheets.* (C. S. Aitchison and others, J. Res. Bureau of Stands., Vol. 28, No. 4, April, 1942, pp. 499-567.)
260	6087	U.S.A.	...	*Influence of Initial Structure and Rate of Heating on the Austenitic Grain Size of 5 per cent. C. Steels and Iron—Carbon Alloy.* (T. G. Digger and S. S. Rosenberg, J. Res. Bureau of Stands., Vol. 29, No. 1, July, 1942, pp. 33-40.)

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261	7043	G.B. ...	...	*Specifications for Aircraft Stainless Steels.* (Aviation, Vol. 41, No. 8, Aug., 1942, pp. 151-153.)
262	7058	Germany	...	*Din Specification* 1,691 *Grey Cast Iron.* (H. Jungbluth and F. Pardun, Stahl und Eisen, Vol. 62, No. 45, 5/11/42, pp. 941-946.)
263	7069	U.S.A.	...	*Carbon Molybdenum Steels* ("*A.M.O.L.A.*"). (F. E. McCleary, Metal Progress, Vol. 43, No. 3, Sept., 1942, pp. 386-388.)
264	7077	U.S.A.	...	*Properties of High Purity Iron.* (H. E. Cleaves and J. M. Hiegel, J. Res. Bureau of Stands., Vol. 28, No. 5, May, 1942, pp. 643-667.)
265	7197	G.B. ...	...	*Low Alloy Steels (Characteristics and Potentialities).* (Autom. Eng., Vol. 32, No. 431, Dec., 1942, pp. 543-545.)
266	7198	U.S.A.	...	*Annealing Steel in an Atmosphere of* H_2. (Autom. Eng., Vol. 32, No. 431, Dec., 1942, p. 527.)
267	7244	G.B. ...	...	*Automatic Steel Hardening Machine.* (Engineering, Vol. 154, No. 4,012, 4/12/42, p. 447.)
268	7361	Germany	...	*Technical Developments in the Lead Bath Process for the Manufacture of Steel Wire.* (J. Rath, Stahl und Eisen, Vol. 62, No. 47, 19/11/42, pp. 977-983.)
269	7364	Germany	...	*Equilibrium Equations for Fe.* + H_2S *Reactions.* (Stahl und Eisen, Vol. 62, No. 47, 19/11/42, pp. 990-991.)
270	7423	G.B. ...	...	*Influence of Tin in Alloy Steels (from British Iron and Steel Institute).* (G. R. Bolsover and S. Barraclough, Metal Progress, Vol. 42, No. 2, Aug., 1942, pp. 214-215.)
271	7439	G.B. ...	...	*Cast Iron Research.* (Engineering, Vol. 174, No. 4,537, 25/12/42, pp. 527-528.)
				Tool Steels and Diamond Dies.
273	6029	G.B. ...	...	*Production of Diamond Tools and Dies.* (Machinery (Ed. B.), Vol. 61, No. 1,564, 1/10/42, pp. 379-383.)
274	6004	G.B. ...	...	*Tipped High Speed Steel Tools.* (L. J. St. Clair, Engineer, Vol. 174, No. 4,532, 20/11/42, pp. 417-419.)
275	7051	U.S.A.	...	*Hard Steel Drill for Case-hardened Steels.* (F. S. Gepfert, Aviation, Vol. 41, No. 8, Aug., 1942, p. 130.)
276	7068	U.S.A.	...	*Heat Treatment of Tool Steels.* (R. C. Stewart, Metal Progress, Vol. 42, No. 3, Sept., 1942.)
277	7143	Germany	...	*The Shaping of Building Stones with Hard Metal Tools.* (H. Eberhardt, Z.V.D.I., Vol. 86, No. 43-44, 31/10/42, pp. 653-654.)
278	7150	U.S.S.R.	...	*Influence of Molybdenum and Vanadium of High Speed Tool Steels Containing 4 per cent. Cr. but Poor in Tungsten (from the Russian).* (Stahl und Eisen, Vol. 62, No. 44, 29/10/42, pp. 922-923.)

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				Solders
279	6079	U.S.A.	...	*Bonding Fins on Copper Tubes.* (Metal Industry, Vol. 61, No. 20, 13/11/42.)
280	6082	U.S.A.	...	*Structural Changes in the Bonding Layer of Soft Soldered Joints in Copper Pipe Lines on Long Continued Heating.* (W. H. Swanger and A. R. Maupin, J. Res. Bureau of Stands., Vol. 28, No. 4, April, 1942, pp. 479-487.)
281	7024	G.B. ...	...	*Metal to Glass Fusion (Kovar Alloy).* (Mechanical World, Vol. 112, No. 2,916, 20/11/42, p. 482.)
282	7247	G.B. ...	...	*Silver Solders containing Additions of Lithium.* (Engineering, Vol. 154, No. 4,012, 4/12/42, p. 460.)
283	7471	U.S.A.	...	*Use of Bismuth in Fusible Alloys.* (Bureau of Standards (Circular No. 388), December, 1930.)
284	7472	U.S.A.	...	*Properties of Lead-Bismuth, Lead-Tin, Type Metal and Fusible Alloys.* (J. G. Thompson, Bureau of Standards (Research Paper No. 248), Nov., 1930.)
285	7475	U.S.A.	...	*Lead-Silver Solders Improved by the Addition of Irdium.* (Autom. Ind., Vol. 87, No. 7, Oct. 1st, 1942, p. 214.)
				Al. Alloys.
286	5988	G.B. ...	...	*Effect of Minor Alloying Elements on Al. Casting Alloys.* (W. Bousack, Metal Industry, Vol. 61, No. 21, 20/11/41, pp. 327-330.)
287	6052	Germany	...	*Problems of the Japanese Aluminium and Magnesium Industries (Possible Annual Output 100,000 tons Al. and 10,000 tons Magnesium).* (Die Chemische Industit, Vol. 65, No. 31-32, 7/8/42, pp. 322-324.)
288	6069	G.B. ...	...	*The Fatigue Strength of Heavily Chromium Plated Dural.* (*R.T.P. Translation No.* 1,383.) (A. Beerwald, Sheet Metal Industry, Vol. 16, No. 188, Dec., 1942, pp. 1,889-1,896.)
289	6075	U.S.A.	...	*Alumina from Low Grade Bauxite, Alunite and Clay (Report by the American War Production Board).* (Metal Industry, Vol. 61, No. 20, 13/11/42, pp. 308-309.)
290	6092	G.B. ...	...	*Effect of Minor Alloying Elements in Al. Casting Alloys.* (W. Bousack, Metal Industry, Vol. 61, No. 22, 27/11/42, pp. 344-345.)
291	7027	G.B. ...	...	*Effect of Minor Alloying Elements as Al. Casting Alloys (Discussion and Extensive Bibliography).* (W. Bousack, A.S.T.M. Bulletin, No. 117, Aug., 1942, pp. 45-59.)
292	7111	Germany	...	*German Standard Specification for Al. Alloys.* (Aluminium, Vol. 24, No. 9, Sept., 1942, pp. 287-292.)
293	7117	Germany	...	*Heat Treatment of Light Alloys—Comparison of Hot Air Furnace and Salt Bath.* (O. Ruder, J. Philippi, Aluminium, Vol. 24, No. 9, Sept., 1942, pp. 315-321.)

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294	7235	G.B.	*Effect of Minor Alloying Elements on Al. Casting Alloys.* (W. Bousack, Metal Industry, Vol. 61, No. 23, 4/12/42, pp. 358-360.)
295	7251	Germany ...	*New German Zinc Alloys.* (Metal Industry, Vol. 61, No. 25, 18/12/42, p. 397.)
296	7346	Germany ...	*Experience with Large Pressure Containers Made in Aluminium.* (W. Mialki, Aluminium, Vol. 24, No. 11, Nov., 1942, pp. 381-384.)
297	7347	Germany ...	*Strength Characteristics of an Al--Mg.-Zn. Alloy After Age Hardening at Room Temperature.* (H. G. Petri, Aluminium, Vol. 24, No. 11, Nov., 1942, pp. 381-384.)
298	7352	G.B.	*Forging of Al. Alloys.* (Metal Industry, Vol. 61, No. 24, 11/12/42, pp. 372-374.)
299	7415	U.S.A. ...	*Alumina from Low Grade Bauxite, Alunite and Clay.* (Nat. Acad. Sciences, Metal Progress, Vol. 42, No. 2, Aug., 1942, pp. 197-200.)
			Plastics.
300	5960	U.S.A. ...	*Pipes Made of Thermo-Plastic "Saran."* (Sci. Am., Vol. 167, No. 5, Nov., 1942, pp. 207-208.)
301	5961	U.S.A. ...	*Cellophane Lining to Cardboard Containers.* (Sci. Am., Vol. 167, No. 5, Nov., 1942, pp. 220-221.)
302	5966	G.B.	*Bonding of Plastic to Metal Sheet (Anchoring by Means of Burred Holes in the Latter), Plastel.* (N. A. de Bruyne, British Plastics, Vol. 14, No. 162, Nov., 1942, pp. 306-316 and 349.)
303	5968	G.B.	*Some Uses of Laminated Phenolic Material.* (British Plastics, Vol. 14, No. 162, Nov., 1942, pp. 325-326.)
304	5970	G.B.	*Water Absorption of Moulded High Impact Resisting Material.* (M. A. Ayan and F. Luce, British Plastics, Vol. 14, No. 162, Nov., 1942, p. 332.)
305	5971	G.B.	*Sawdust as a Plastic Filler.* (British Plastics, Vol. 14, No. 162, Nov., 1942, p. 360.)
306	5972	G.B.	*Weather Resisting Acetate Sheeting for Aircraft Windows (Du Pont de Nemours).* (British Plastics, Vol. 14, No. 162, Nov., 1942, p. 334.)
307	5976	G.B.	*Effect of Cure on the Properties of Urea Formaldehyde Mouldings.* (J. Hofton, British Plastics, Vol. 14, No. 162, Nov., 1942, pp. 350-352.)
308	6001	G.B.	*Plastics and the Engineer.* (R. Hammond, Engineer, Vol. 174, No. 4,532, 20/11/42, pp. 412-414.)
309	6009	U.S.A. ...	*Plastic for Waterproofing Materials—Saflex Vinyl-acetal Resin).* (Ind. and Eng. Chem. (News Ed.), Vol. 20, No. 17, 10/9/42, pp. 1,113 and 1,116-1,117.)
310	6015	U.S.A. ...	*Cotton Seed Meal as a Filler for Phenolic Resins.* (F. Rosenthal, Ind. and Eng. Chem. (Indus. Ed.), Vol. 34, No. 10, Oct., 1942, pp. 1,154-1,157.)
311	6094	G.B.	*Classification of Plastics.* (W. L. Morse, Aeronautics, Vol. 7, No. 5, Dec., 1942, pp. 32-37.)
312	7092	G.B.	*Thermoplastic Resin "Formvar" as a Veneer Bond for Hydulignum Airscrews.* (Plastics, Vol. 6, No. 67, Dec., 1942, pp. 425-427.)

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313	7093	G.B.	*Pliable Plastic Tubing (Polyvinylidene Chloride).* (H. W. Perry, Plastics, Vol. 6, No. 67, Dec., 1942, pp. 429-430.)
314	7094	G.B.	*Polyvinyl Acetate Adhesives.* (E. E. Halls, Plastics, Vol. 67, No. 67, Dec., 1942, pp. 431-435.)
315	7095	Germany ...	*Mechanical Properties of Plastics at Low Temperature* (from the German). (Plastics, Vol. 6, No. 67, Dec., 1942, pp. 439-442.)
316	7096	Germany ...	*Standardisation of Plastics in Germany.* (Plastics, Vol. 6, No. 67, Dec., 1942, pp. 442-443.)
317	7097	G.B.	*Resinoids and Other Plastics as a Film Former (Electronic Theory).* (B. J. Brajnikoff, Plastics, Vol. 6, No. 67, Dec., 1942, pp. 459-468.)
318	7144	Germany ...	*Non-Isotropic Expansion of Laminated Plastics.* (Z.V.D.I., Vol. 86, No. 43-44, 31/10/42, p. 654.)
319	7183	G.B.	*Effect of Conditioning (Temperature and Moisture) Upon Some Physical Properties of Urea Formaldehyde Mouldings.* (J. Hoften, British Plastics, Vol. 14, No. 163, Dec., 1942, pp. 377-380.)
320	7185	G.B.	*A New Wood Material (Hydulignum).* (British Plastics, Vol. 14, No. 163, Dec., 1942, pp. 381-384.)
321	7187	U.S.A. ...	*Heating Plastic Bonded Plywood by High Frequency Electric Currents.* (British Plastics, Vol. 14, No. 163, Dec., 1941, p. 394.)
322	7188	U.S.A. ...	*"Louverglas" Acetate Plastic (Antiglare for Fluorescent Lamps).* (British Plastics, Vol. 14, No. 163, Dec., 1942, pp. 394 and 402.)
323	7189	G.B.	*Limited Use of Plastics in Warfare.* (British Plastics, Vol. 14, No. 163, Dec., 1942, p. 423.)
324	7191	G.B.	*"Saran" Plastic for Seat Coverings (Vinylidene Chloride).* (British Plastics, Vol. 14, No. 163, Dec., 1942, p. 424.)
325	7193	G.B.	*The Future of Plastics.* (C. Chapman, Chem. and Ind., Vol. 61, No. 50, 12/12/42, pp. 509-511.)
326	7206	U.S.A. ...	*Ethyl Cellulose Plastic Tubing (Flexes at −70°F.).* (Army Ordnance, Vol. 22, No. 135, Nov.-Dec., 1942, p. 430.)
327	7215	G.B.	*Plastics Abstracts Prepared by Controller of Chemical Research.* (No. 39, November, 1942.)
328	7320	G.B.	*New Artificial Textiles (Protein Fibres).* (D. B. Halpern, Times and Trade Engineering, Vol. 52, No. 945, Nov., 1942, p. 12.)
329	7354	U.S.A. ...	*Saran Plastic Pipe.* (Ind. and Eng. Chem. (News Ed.), Vol. 20, No. 20, 25/10/42, p. 1,333.)
330	7371	U.S.A. ...	*Transparent Plastic Pipe for Cooling Systems (Terrik).* (Ind. and Eng. Chem. (News Ed.), Vol. 20, No. 20, 25/10/42, p. 1,317.)
331	7456	U.S.A. ...	*Loss of Plasticizers from Polyvinyl Chloride Plastics in Vacuum.* (H. A. Liebhapky, Ind. and Eng. Chem (Ind. Ed.), Vol. 34, No. 6, June, 1942, pp. 704-708.)
332	7458	U.S.A. ...	*Protein Aldehyde Plastics.* (D. C. Carpenter and P. E. Lovelace, Ind. and Eng. Chem. (Ind. Ed.), Vol. 34, No. 6, June, 1942, pp. 759-763.)

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333	7459	U.S.A.	...	*Effect of Solvent on Solid Organic Plastics.* (J. Delmonte, Ind. and Eng. Chem. (Ind. Ed.), Vol. 34, No. 6, June, 1942, pp. 764-771.)
				Rubber.
334	6008	U.S.A.	...	*Rubberlike Soybean Material.* (Ind. and Eng. Chem. (News Ed.), Vol. 20, No. 17, 10/9/42, p. 1,112.)
335	6014	U.S.A.	...	*Technical Microscopy in the Rubber Industry.* (R. P. Allen, Ind. and Eng. Chem. (Anal. Ed.), Vol. 14, No. 9, 15/9/42, pp. 740-750.)
336	6017	U.S.A.	...	*Low Temperature Flexibility Behaviour of Vinyl Elastometer (Synthetic Rubber).* (R. F. Clash and R. M. Berg, Ind. and Eng. Chem., Vol. 34, No. 10, Oct., 1942, pp. 1,218-1,222.)
337	6081	U.S.A.	...	*Frictional Properties of Rubber.* (F. L. Roth and others, J. Res. Bureau of Stands., Vol. 28, No. 4, April, 1942, pp. 439-462.)
338	7028	G.B.	...	*S.A.E.-A.S.T.M. Classifications Recommended for Natural and Synthetic Rubbers.* (A.S.T.M. Bulletin No. 117, Aug., 1942, pp. 66-69.)
339	7032	G.B.	...	*Rubber Mouldings with a Felt Core.* (Airc. Prod., Vol. 4, No. 49, Nov., 1942, p. 638.)
340	7186	U.S.A.	...	*Soft Rubber-like Plastic from Cellulose Derivatives.* (D. R. Wiggan, British Plastics, Vol. 14, No. 163, Dec., 1942, pp. 420-422.)
341	7190	U.S.A.	...	*Synthetic Rubber.* (A. Tomlin, British Plastics, Vol. 14, No. 163, Dec., 1942, pp. 398-402.)
342	7312	U.S.A.	...	*Natural Rubber from the Gauyule Shrub (California).* (Engineer, Vol. 174, No. 4,536, 18/12/42, pp. 505-506.)
343	7370	Germany	...	*Natural Rubber in Eastern Europe.* (Ind. and Eng. Chem. (News Ed.), Vol. 20, No. 20, 25/10/42, p. 1,312.)
344	7382	U.S.A.	...	*The Houdry System of Producing Butadiene (Deleted by Censor).* (C. H. Thayer, Autom. Ind., Vol. 87, No. 8, 15/10/42, pp. 30-32.)
345	7476	U.S.A.	...	*The Rubber Position in the U.S.A.* (Autom. Ind., Vol. 87, No. 7, Oct. 1st, 1942, pp. 168-171 and 244-262.)
				Wood and Cork.
346	5959	U.S.A.	...	*Determination of Moisture Content of Wood by the Electrical Resistance Method.* (Sci. Am., Vol. 167, No. 5, Nov., 1942, pp. 207-208.)
347	5969	G.B.	...	*Weatherproofing Plywood by Plastic Coating.* (British Plastics, Vol. 14, No. 162, Nov., 1942, pp. 359-360.)
348	5974	U.S.A.	...	*Urea Treatment of Lumber (Prevents Cracking and Eases Bending).* (British Plastics, Vol. 14, No. 162, Nov., 1942, pp. 356-357.)
349	5997	G.B.	...	*Fireproofing of Timber.* (Engineering, Vol. 154, No. 4,010, 20/11/42, p. 415.)
350	6057	Germany	...	*Buckling Diagram for Spruce Spars (Design Chart 3-4).* (S. Blumrich, Flugsport, Vol. 34, No. 24, 25/11/42, p. 3,669.)

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351	7031	G.B.	...	*Pneumatic Damping for Plywood Skins.* (Airc. Prod., Vol. 4, No. 49, November, 1942, pp. 635-636.)
352	7243	G.B.	...	*Utilisation of Wood Refuse.* (Engineering, Vol. 154, No. 4,012, 4/12/42, p. 446.)
353	7356	G.B.	...	*Elastic Constants of Plywood.* (R. F. S. Hearmon, Airc. Eng., Vol. 14, No. 166, Dec., 1942, pp. 336-337 and 340.)
354	7445	G.B.	...	*Working Stresses for Indian Timbers.* (Nature, Vol. 150, No. 3,811, 14/11/42, p. 571.)
355	7452	U.S.A.	...	*Composition Cork for Liquid and Moisture Tight Gaskets.* (L. P. Hart and others, Ind. and Eng. Chem. (Ind. Ed.), Vol. 34, No. 6, June, 1942, pp. 649-658.)
356	7473	U.S.A.	...	*Plywood in Aircraft Construction:* (O. W. Timm, Autom. Ind., Vol. 87, No. 7, Oct. 1st, 1942, pp. 104-110.)
				Bearing Alloys.
357	6077	G.B.	...	*Tin Base Bearing Metals.* (Metal Industry, Vol. 61, No. 20, 13/11/42, p. 309.)
358	6091	G.B.	...	*Bonding of Lead Base Alloys to Steel Shells.* (Metal Industry, Vol. 61, No. 22, 27/11/42, p. 341.)
359	7072	U.S.A.	...	*Adhesion of Tin Base Bearing Metals.* (W. I. Pell-Walpole and others, Vol. 42, No. 3, Sept., 1942, pp. 438-442.)
360	7119	G.B.	...	*Corrosion Resistant Alloys for Bearing Parts.* (H. Habart, Bearing Engineer, Vol. 2, No. 2, April, 1942, p. 3.)
361	7170	U.S.A.	...	*White Metal Bearing Alloys—Mechanical Properties at Different Temperatures and Service Tests.* (H. K. Herschmann and J. L. Basil, Bureau of Standards Journal of Research, Vol. 10, 1933, pp. 1-5.)
362	7180	U.S.A.	...	*Tin Free Leaded Bearing Bronzes.* (H. K. Herschmann and J. L. Basil, Bureau of Standards Journal of Research, Vol. 10, 1933, pp. 591-608.
363	7249	G.B.	...	*Silver for Bearings.* (A. Bregman, Metal Industry, Vol. 61, No. 25, 18/12/42, pp. 389-392.)
364	7351	G.B.	...	*Hardness of Tin-Base Alloys.* (Metal Industry, Vol. 61, No. 24, 11/12/42, p. 371.)
365	7422	U.S.A.	...	*Fixing Bearing Metal in Steel Shells.* (Metal Progress, Vol. 42, No. 2, Aug., 1942, pp. 213-214.
				Magnetic Materials.
366	7223	U.S.A.	...	*New Magnetic Materials.* (W. E. Ruder, Procs. I.R.E., Vol. 30, No. 10, Oct., 1942, pp. 437-440.
367	7362	Germany	...	*Compressed Powder Magnets with Synthetic Resin Binder.* (H. Dehler, Stahl und Eisen, Vol. 62, No. 47, 19/11/42, pp. 983-986.)
				Materials Testing and Surface Investigation.
368	5973	U.S.A.	...	*X-Ray Measurement of the Thickness of the Cold-Worked Surface Layer Resulting from Metallographic Polishing.* (*R.P.* 1,494.) (H. C. Vacher, J. Res. Bur. of Stands., Vol. 29, No. 2, Aug., 1942, pp. 177-181.)

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369	6044	Germany	...	*Measurement of Degree of Roughness of High Quality Surfaces.* (W. Lueg, Der Betrieb, Vol. 28, No. 8, Aug., 1942, p. 340.)
370	6067	G.B.	...	*Methods of Measuring the Thickness and Porosity of Metallic Castings.* (A. Brenner, Sheet Metal Industry, Vol. 16, No. 188, Dec., 1942, pp. 1,861-1,865.)
371	7029	G.B.	...	*Verification and Classification of Strain Gauges.* (A.S.T.M. Bulletin, No. 117, Aug., 1942, pp. 83-85.)
372	7048	U.S.A.	...	*Residual Method of Magnaflux Testing (Indicating Medium Applied After Magnetism).* (M. L. Mages, Aviation, Vol. 41, No. 8, Aug., 1942, pp. 118-120 and 155.)
373	7057	Germany	...	*25 Years of German Engineering Specifications.* (W. Hellmich, Stahl und Eisen, Vol. 62, No. 45, 5/11/42, pp. 937-941.)
374	7107	G.B.	...	*Mechanical Testing of Light Alloys.* (Airc. Prod., Vol. 4, No. 50, Dec., 1942, pp. 720-723.)
375	7114	Germany	...	*Service Investigation of Al. and Hydronalium by Means of the Electron Microscope (15 Photographs Showing Difference Between Rolled, Recrystallised and Cast State).* (E. Semmler, Aluminium, Vol. 24, No. 9, Sept., 1942, pp. 302-307.)
376	7228	G.B.	...	*The Resin Method of Indicating Yield.* (J. S. Blair, Engineer, Vol. 174, No. 4,534, 4/12/42, pp. 455-456.)
377	7310	U.S.A.	...	*Trends in the Technique of Industrial Radiography.* (H. E. Seeman, Engineer, Vol. 174, No. 4,536, 18/12/42, pp. 492-495.)
378	7363	Germany	...	*Elimination of Errors in Impact Strength Determination.* (W. Marx, Stahl und Eisen, Vol. 62, No. 47, 19/11/42, pp. 989-990.)
380	7416	U.S.A.	...	*Shepherd Grain Size Fracture Standards (Stereoscopic Photographs).* (G. K. Manning, Metal Progress, Vol. 42, No. 2, Aug., 1942, p. 2,269.)
381	7419	U.S.A.	...	*Method of Sampling for Metallurgical Test Pieces.* (C. T. Eakin, Metal Progress, Vol. 42, No. 2, Aug., 1942, pp. 207-208.)
382	7429	G.B.	...	*Standard Reference Blocks for Surface Finish.* (Engineering, Vol. 155, No. 4,016, 1/1/43, pp. 19-20.)
383	7437	G.B.	...	*"Pulsator" Fatigue Testing Machine.* (Engineering, Vol. 174, No. 4,537, 25/12/42, pp. 517-518.)
384	7449	Germany	...	*Fatigue Strength, Extension and X-Ray Internal Stress Investigations on Machined Crankshafts After Straightening.* (R. Schmidt, Luftwissen, Vol. 9, No. 9, Sept., 1942, pp. 263-267.)

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				Rapid Identification and Analysis.
385	6007	U.S.A.	...	*Purity of Mercury Estimated from Surface Tension.* (E. Wichers, Ind. and Eng. Chem. (News Ed.), Vol. 20, No. 17, 10/9/42, p. 1,110.)
386	6010	U.S.A.	...	*Chemical Analysis of Tin Base Bearing Metals.* (J. R. Andrews and A. J. Bender, Ind. and Eng. Chem. (Anal. Ed.), Vol. 14, No. 9, 15/9/42, pp. 713-714.)
387	6011	U.S.A.	...	*Determination of Al. in Manganese and Al. Bronzes (Mercury Cathode Cell Method).* (A. C. Hollard and J. P. Yeager, Ind. and Eng. Chem. (Anal. Ed.), Vol. 14, No. 9, 15/9/42, pp. 719-720.)
388	7015	...	...	*Simple Hardness Gauge for Al. Alloys.* (Rev. of Scientific Insts., Vol. 19, No. 10, Oct., 1942, p. 159.)
389	7060	Germany	...	*Determination of Zn. in Al. Alloy (Chemical).* (R. Bauer and J. Eisen, Stahl und Eisen, Vol. 62, No. 45, 5/11/42, p. 949.)
390	7061	Germany	...	*Determination of Zn. in Al. Alloys (Electrolytic).* (K. Steinhauser, Stahl und Eisen, Vol. 62, No. 45, 5/11/42, p. 949.)
391	7062	Germany	...	*Determination of Sn. in Al. Alloys (Chemical).* (K. Steinhauser, Stahl und Eisen, Vol. 62, No. 45, 5/11/42, pp. 949-950.)
392	7063	Germany	...	*Determination of Fe. in Mg. (Rapid "Colorimetric" Method).* (W. Leitgebel and G. Muss, Stahl und Eisen, Vol. 62, No. 45, 5/11/42, pp. 950.)
393	7064	Germany	...	*Rapid Determination of Mg. in Al.-Mg. Alloy by X-Ray Diffraction.* (H. Kustner, Stahl und Eisen, Vol. 62, No. 45, 5/11/42, p. 950.)
394	7175	U.S.A.	...	*Magnetic Balance for the Inspection of Austenitic Steel.* (R. L. Sanford, Bureau of Standards Journal of Research, Vol. 10, 1933, pp. 619-637.)
395	7194	G.B. ...	...	*Analytical Uses of Absorptionmeter, Polarograph and Spectrograph (Critical Review).* (H. K. Whalley, Chem. and Ind., Vol. 61, No. 49, 5/12/42, pp. 495-497.)
396	7199	G.B. ...	...	*Rapid Identification of Ni. Steels (Nitric Acid Reaction, Dymethylglyoxime Indicator).* (Autom. Eng., Vol. 32, No. 431, Dec., 1942, p. 30.)
397	7315	U.S.A.	...	*Gravimetric Determination of Al. in Mg. Alloys (Benzoate-Oxine Method).* (V. A. Stenger and others, Ind. and Eng. Chem. (Anal. Ed.), Vol. 14, No. 10, 16/10/42, pp. 797-798.)
398	7316	U.S.A.	...	*Determination of C in Low Carbon Iron and Steel (Low Pressure Combustion).* (L. A. Wooten and W. G. Guldner, Ind. and Eng. Chem. (Anal. Ed.), Vol. 14, No. 10, 16/10/42, pp. 835-838.)
399	7349	Germany	...	*Practical Experience with a Fully Automatic Tuning Device for Spectrographic Analysis (Zeiss).* (H. Moritz, Aluminium, Vol. 24, No. 11, Nov., 1942, pp. 394-396.)

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				Degreasing.
400	6072	U.S.A.	...	*Quantitative Evaluation of Metal-Cleaning Compounds.* (O. M. Morgan and J. B. Lankler, Ind. and Eng. Chem. (Anal. Ed.), Vol. 14, No. 9, 15/9/42, pp. 725-726.)
401	6016	U.S.A.	...	*Evaluation of a Surface Active Agent (Alkyl Arye Sodium Sulphonetic) for Metal Cleaning.* (O. M. Morgan and T. G. Lankler, Ind. and Eng. Chem. (Ind. Ed.), Vol. 34, No. 10, Oct., 1942, pp. 1,158-1,157.)
402	6038	G.B.	...	*Metal Degreasing.* (Airc. Eng., Vol. 14, No. 165, Nov., 1942, pp. 329-330.)
403	7236	G.B.	...	*Surface Active Agent for Metal Cleaning (Sodium Sulphonate Base).* (O. M. Morgan and J. G. Lankle, Metal Industry, Vol. 61, No. 22, 4/12/42, p. 361.)
				Corrosion.
404	5965	U.S.A.	...	*Water Immersion Testing of Metal Protective Paints.* (W. W. Kittelberger, Vol. 34, No. 8, Aug., 1942, pp. 943-948.)
405	5987	G.B.	...	*Corrosion of Mg. and Mg.-Base Alloys.* (C. J. Bushrod, Metal Industry, Vol. 61, No. 21, 20/11/42, pp. 324-325.)
406	5994	U.S.A.	...	*Soil Corrosion Studies 1939—Ferrous and Non-Ferrous Corrosion Resistant Materials.* (K. H. Logan, J. Res. Bur. Stands., Vol. 28, No. 3, March, 1942, pp. 379-400.)
407	6000	G.B.	...	*Corrosion of Boiler Tubes.* (T. H. Turner, Engineer, Vol. 174, No. 4,533, 27/11/42, pp. 446-448.)
408	6068	G.B.	...	*Influence of Delayed Quenching During Solution Heat Treatment on the Resistance of Dural to Intercrystalline Corrosion.* (J. C. Arrowsmith and G. Murray, Vol. 16, No. 188, Dec., 1942, pp. 1,879-1,884 and 1,910.)
409	7056	G.B.	...	*Boiler Scale Prevention.* (Electrician, Vol. 129, No. 3,353, 13/11/42, pp. 525-527.)
410	7075	U.S.A.	...	*Rate of Oxidation of Typical Non-Ferrous Metals as Determined by Interference Colours of Oxide Films.* (D. J. McArthur and C. W. Jeil, J. Res. Bureau of Stands., Vol. 28, No. 5, May, 1942.)
411	7122	G.B.	...	*Corrosion Prevention by Re-Lubrication of Needle Bearing.* (H. W. Hayes, Bearing Engineer, Vol. 2, No. 4, Aug., 1942, p. 3.)
412	7230	G.B.	...	*Corrosion of Boiler Tubes.* (T. H. Turner, Engineer, Vol. 174, No. 4,534, 4/12/42, pp. 466-468.)
413	7245	G.B.	...	*Caustic Embrittlement.* (E. W. Colbeck and others, Engineering, Vol. 154, No. 4,012, 4/12/42, p. 455.)
414	7246	G.B.	...	*Corrosion of Boiler Tubes.* (T. H. Turner, Engineering, Vol. 154, No. 4,012, 4/12/42, pp. 455-456.)
415	7304	G.B.	...	*Corrosion in Boiler Tubes.* (T. H. Turner, Engineering, Vol. 154, No. 4,013, 11/12/42, pp. 464-465.)

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416	7309	G.B.	*Caustic Embrittlement.* (E. W. Colbeck and others, Engineering, Vol. 154, No. 4,013, 11/12/42, pp. 478-480.)
417	7434	G.B.	*Corrosion of Boiler Tubes.* (T. H. Turner, Engineering, Vol. 154, No. 4,015, 25/12/42, pp. 503-505.)
418	7436	G.B.	*Caustic Embrittlement.* (E. W. Colbeck and others, Engineering, Vol. 154, No. 4,015, 25/12/42, pp. 517-529.)
419	7457	U.S.A. ...	*Corrosion of Steel by Dissolved Carbon Dioxide and Oxygen.* (G. T. Skaperdas and H. H. Uhlig, Ind. and Eng. Chem. (Ind. Ed.), Vol. 34, No. 6, June, 1942, pp. 748-754.)
			Surface Treatment.
420	5963	U.S.A. ...	*P.H. Control of Chromic Acid Anodic Baths.* (W. H. Hartford, Ind. and Eng. Chem. (Ind. Ed.), Vol. 34, No. 8, Aug, 1942, pp. 920-924.)
421	5992	Germany ...	*Anti-Corrosion Surface Treatment by Volatile Cr. Compounds (Irkrom Process).* (Ind. and Eng. Chem. (News Ed.), Vol. 20, No. 19, 10/10/42, p. 1,247.)
422	6070	G.B.	*Causes of Fish Scaling of Enamels.* (W. W. Higgins, Sheet Metal Industry, Vol. 16, No. 188, Dec., 1942, pp. 1,894-1,896.)
423	6093	G.B.	*M.A.P. Specification on Protective Metallic Coatings (Discussion).* (Metal Industry, Vol. 61, No. 22, 27/11/42, pp. 346-348.)
424	7073	U.S.A. ...	*Elimination of Oxide Films on Ferrous Materials by Heating in Vacuum.* (V. C. F. Holm, J. Res. Bureau of Stands., Vol. 28, No. 5, May, 1942, pp. 569-579.)
425	7152	Germany ...	*Sea Water Tests on Rust Resisting Paints and Varnishes.* (W. Kronsbein, W.R.H., Vol. 23, No. 17, 1/9/42, pp. 233-242.)
426	7169	Germany ...	*Metal Spraying of Fabrics.* (M. W. Schsop and C. H. Daeschle, Handbook of Metal Spraying Technique, 1935, pp. 148-151.)
427	7354	G.B.	*Mechanism of Bright Electroplating, I (Nickel Deposition).* (J. A. Henrick, Metal Industry, Vol. 61, No. 24, 11/12/42, pp. 378-380.)
428	7420	U.S.A. ...	*Simplified Electro Polishing of Steel Specimens.* (R. W. Parcel, Metal Progress, Vol. 42, No. 2, Aug., 1942, pp. 209-212.)
			Casting.
429	6076	G.B.	*Designing Die Castings.* (Metal Ind., Vol. 61, No. 20, 13/11/42, p. 309.)
430	6089	G.B.	*Producing Non-Ferrous Castings Centrifugally.* (H. B. Zuelke, Metal Industry, Vol. 61, No. 22, 27/11/42, pp. 338-341.)
431	7112	Germany ...	*On Mysterious Periods of Rejects in the Al. Foundry.* (P. Schwerber, Aluminium, Vol. 24, No. 9, Sept., 1942, pp. 293-297.)
432	7302	G.B.	*Steel Foundry Moulding Materials.* (Engineering, Vol. 154, No. 4,014, 18/12/42, pp. 487-488.)

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433	7435	G.B.	*Steel Foundry Moulding Materials.* (Engineering, Vol. 154, No. 4,015, 25/12/42, p. 514.)
			Rolling.
434	6088	U.S.A. ...	*Effect of Moderate Cold Rolling on the Hardness of the Surface Layer of .34 per cent. C. Steel Plates.* (H. K. Herschmann, J. Res. Bureau of Stands., Vol. 29, No. 1, July, 1942, pp. 57-67.)
435	7148	Germany ...	*Influence of Cold Rolling on the Properties of 18 per cent. Cr., 8 per cent. Ni. Steel.* (W. Puyicha, Stahl und Eisen, Vol. 62, No. 44, 29/10/42, pp. 920-921.)
436	7348	Germany ...	*Some Notes on Rolling Mills for Light Alloys.* (W. Kramer, Aluminium, Vol. 24, No. 11, Nov., 1942, pp. 390-393.)
			Drawing and Forming.
437	6037	U.S.A. ...	*Elastic Theory in Sheet-Forming Problems (from the U.S.A.).* (F. R. Stanley, Airc. Eng., Vol. 14, No. 165, Nov., 1942, pp. 325-328.)
438	6074	G.B.	*Carbide Dies for Tube Drawing.* (E. Glen, Metal Ind., Vol. 61, No. 20, 13/11/42, pp. 306-307.)
439	7113	Germany ...	*The Effect of Tempering Temperature on the Drawing Qualities of Hard Rolled Pure Al. Sheets (220° ± 5°C. Recommended).* (A. J. Stelljes, Aluminium, Vol. 24, No. 9, Sept., 1942, pp. 298-302.)
440	7383	U.S.A. ...	*Technical Aspects of Sheet Metal Forming, Part 2 (Partly Deleted by Censor).* (F. R. Shawley, Autom. Ind., Vol. 87, No. 8, 15/10/42, pp. 33-37.)
441	7424	U.S.A. ...	*Wedge Draw v. Tension Test to Determine Drawability of Al. Alloys.* (G. A. Brewer, Metal Progress, Vol. 42, No. 2, Aug., 1942, pp. 216-217.)
442	7474	U.S.A. ...	*Sheet Metal Forming.* (F. R. Shanley, Autom. Ind., Vol. 87, No. 7, Oct. 1st, 1942, pp. 112-123.)
			Welding.
443	5977	U.S.A. ...	*The Tee Bend Test to Compare the Welding Quality of Steels (R.P. 1,444).* (G. A. Ellinger and others, J. Res. Bur. of Stands., Vol. 28, No. 1, Jan., 1942, pp. 1-49.)
444	5989	U.S.A. ...	*Spirally Brazed Steel Tubing (from the U.S.A.).* (Metal Industry, Vol. 61, No. 21, 20/11/42, pp. 331-332.)
445	5990	G.B.	*Welding of Al. Castings.* (Metal Industry, Vol. 61, No. 21, 20/11/42, p. 332.)
446	6066	G.B.	*Electronic Control of Resistance Welding Machines.* (G. Higgins, Sheet Metal Industry, Vol. 16, No. 188, Dec., 1942, pp. 1,917-1,922.)
447	6071	G.B.	*Performance of Modified Resistance Welding Electrodes.* (S. H. Parsonage, Sheet Metal Industry, Vol. 16, No. 188, Dec., 1942, pp. 1,913-1,916.)
448	7071	U.S.A. ...	*Fusian Welding of Magnesium in an Atmosphere of Helium (Heliarc Process).* (T. E. Piper, Metal Progress, Vol. 42, No. 3, Sept., 1942, pp. 404 and 412.)

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449	6085	G.B.	*Development in Welded Ship Construction.* (J. L. Adam, Engineering, Vol. 154, No. 4,011, 27/11/42, pp. 425-426.)
450	7250	U.S.A. ...	*Inspection of Al. Welds (American Standards).* (Metal Industry, Vol. 61), No. 25, 18/12/42, pp. 395-396.)
451	7267	G.B.	*Welding of Mg. Alloys (Heliarc and Oxy-Acetylene Methods Compared).* (Flight, Vol. 42, No. 1,773, 17/12/42, p. 670.)
452	7305	G.B.	*Developments in Welded Ship Construction.* (J. L. Adams, Engineering, Vol. 154, No. 4,013, 11/12/42, pp. 465-466.)
453	7321	G.B.	*Recent Advances in Arc Welding.* (Times Trade and Engineering, Vol. 52, No. 945, Nov., 1942, p. 30.)
454	7365	Germany ...	*The Annealing of High Duty Electro Welds.* (Stahl und Eisen, Vol. 62, No. 47, 19/11/42, p. 991.)
455	7407	G.B.	*Preheating for Al. Welding.* (Mech. World, Vol. 112, No. 2,921, 25/12/42, p. 613.)
456	7417	U.S.A. ...	*Fish Eyes in Steel Welds Caused by Hydrogen.* (C. A. Zepffe, Metal Progress, Vol. 42, No. 2, Aug., 1942, pp. 201-206.)
457	7421	U.S.A. ...	*Prevention of Cracks in Welded Low Alloy Steel.* (E. C. Rollason and A. H. Cottrell, Metal Progress, Vol. 42, No. 2, Aug., 1942, pp. 212, 282, 290, 292, 296, 300.)
			Flame Hardening.
458	7070	U.S.A. ...	*Advances in Flat Surface Hardening (Radiant Combustion in Gas Flame).* (F. O. Hess, Metal Progress, Vol. 43, No. 3, Sept., 1942, pp. 399-402.)
459	7406	G.B.	*Shorter Blade Hardening Machine with Ward-Leonard Speed Control.* (Mech. World, Vol. 112, No. 2,921, 26/12/42, pp. 611 and 613.)
			Grinding and Stress Relief.
460	7200	G.B.	*Thread Grinding.* (Autom. Eng., Vol. 32, No. 431, Dec., 1942, pp. 533-534.)
461	7233	U.S.A. ...	*Relief of Residual Stress in Streamline Tie Rods.* (R. E. Pollard and F. M. Reinhart, Bur. of Stands. J. Res., Vol. 28, No. 6, June, 1942, pp. 755-772.)
			Metal Diffusion.
462	7151	Germany ...	*Diffusion of C. and P. in Steels.* (Stahl und Eisen, Vol. 62, No. 44, 29/10/42, p. 926.)
463	7353	G.B.	*Diffusion of Metals Accompanied by a Phase Change.* (Metal Industry, Vol. 61, No. 24, 11/12/42, p. 374.)
			Miscellaneous.
464	5962	U.S.A. ...	*Industrial Utilisation of Selenium and Tellurium.* (G. R. Waitkins and others, Ind. and Eng. Chem. (Ind. Ed.), Vol. 34, No. 8, Aug., 1942, pp. 899-910.)

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465	7237	G.B.	*Beryllium Copper.* (L. B. Hunt, Electronic Engineering, Vol. 14, No. 178, Dec., 1942, pp. 276-279.)
466	5991	U.S.A. ...	*"Fiberglass" in Building Construction.* (Ind. and Eng. Chem. (News Ed.), Vol. 20, No. 19, 10/10/42, p. 1,236.)
			Production.
			Planning.
467	7108	G.B.	*Control of Production (Planning and Progress System).* (F. A. Carey, Airc. Prod., Vol. 4, No. 50, Dec., 1942, pp. 724-726.)
468	7140	Germany ...	*Increasing Output by Proper Choice of Semi-Finished Product and Utilisation of Special Machine Tools.* (O. Kienzle, Z.V.D.I., Vol. 86, No. 43-44, 31/10/42, pp. 641-648.)
469	7425	G.B.	*The Costing of Government Contracts.* (Engineering, Vol. 155, No. 4,016, 1/1/43, p. 12.)
470	7461	U.S.A. ...	*U.S. Army-Navy Standardisation.* (D. G. Lingle and G. A. Seitz, S.A.E.J., Vol. 50, No. 11, Nov., 1942, pp. 32-33 and 66-80.)
471	7463	U.S.A. ...	*The War Production Effort in Aircraft.* (T. P. Wright, S.A.E.J., Vol. 50, No. 11, Nov., 1942, pp. 29-31 and 64-66.)
			Labour.
472	7103	G.B.	*Training Female Labour (Westland Aircraft).* (Airc. Prod., Vol. 4, No. 50, Dec., 1942.)
473	7358	G.B.	*Medical Aspects of Labour Dilution.* (Airc. Eng., Vol. 14, No. 166, Dec., 1942, pp. 359-360.)
			Methods and Equipment.
474	6020	U.S.A. ...	*Production Testing Facilities of Allison Division of General Motors.* (H. J. Buttner, S.A.E.J., Vol. 50, No. 10, Oct., 1942, pp. 444-449.)
475	6028	U.S.A. ...	*Manufacturing Methods at the New Douglas Airplane Works.* (Machinery (Ed. B.), Vol. 61, No. 1,564, 1/10/42, pp. 371-375.)
476	6056	Germany ...	*Box for Small Parts with Automatically Closing Lid to Prevent Spilling.* (Blohm and Voss, Flugsport, Vol. 34, No. 24, 25/11/42, pp. 359-360.)
477	6091	G.B.	*Drop Hammer Forming of Aircraft Parts.* (C. H. Miller and R. B. Stubbs, Metal Industry, Vol. 61, No. 22, 27/11/42, p. 342.)
478	7022	G.B.	*Portable Electric Tools (Application, Protection and Maintenance).* (Mechanical World, Vol. 112, No. 2,916, 20/11/42, pp. 477-478.)
479	7033	G.B.	*Template Reproduction by Electrolyte Transfer.* (Airc. Prod., Vol. 4, No. 49, Nov., 1942, p. 650.)
480	7034	G.B.	*Rotol Electrically Operated Airscrew (Production).* (J. A. Oates, Airc. Prod., Vol. 4, No. 49, Nov., 1942, p. 650.)
481	7037	U.S.A. ...	*Boeing Fortress Production.* (Airc. Production, Vol. 4, No. 49, Nov., 1942, pp. 669-671.)

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482	7039	G.B.	*Stirling Undercarriage* (*Production and Testing*). (Airc. Prod., Vol. 4, No. 49, Nov., 1942, pp. 672-679.)
483	7044	U.S.A. ...	*Castaloy Fixtures for Aircraft Production* (*Jigs*). (C. S. Ricker, Aviation, Vol. 41, No. 8, Aug., 1942, pp. 106-109.)
484	7050	U.S.A. ...	*Induction Heating for Aircraft Production.* (J. W. Cable, Aviation, Vol. 41, No. 8, Aug., 1942, pp. 127-128.)
485	7082	Germany ...	*Jigs for Large Aircraft Parts* (*Pat. Series* 40, No. 725,369). (Henschel, Flugsport, Vol. 34, No. 22, 28/10/42, p. 161.)
486	7106	G.B.	*Production of Walrus Amphibian, Part II.* (F. C. Sheffield, Airc. Prod., Vol. 4, No. 50, Dec., 1942, pp. 710-715.)
487	7360	U.S.S.R. ...	*YAK-1* (*I-26*) *in Production* (*Photograph*). (Airc. Eng., Vol. 14, No. 166, Dec., 1942, pp. 363-364.)
488	7380	U.S.A. ...	*Boeing's Production of Flying Fortresses by the Density System.* (Autom. Ind., Vol. 81, No. 8, 15/10/42, pp. 16-19 and 56.)
489	7477	U.S.A. ...	*Taking Out Skin Wrinkles by Electric Heaters* (*Glenn Martin Aircraft*). (Autom. Ind., Vol. 87, No. 7, Oct. 1st, 1942, p. 83.)
			Reconditioning.
490	6046	Germany ...	*Performance of Mechanically Reconditioned and Chemically Sharpened Files.* (H. Schallbroch and W. Bieling, Werkstatt and Betrieb, Vol. 75, No. 8, Aug., 1942, pp. 175-179.)
491	6045	Germany ...	*Wear of Cutting Tools as Affected by Shape of Tool.* (H. Ferchland, Der Betrieb, Vol. 28, No. 8, Aug., 1942, pp. 333-336.)
492	7036	G.B.	*Servicing of Fluorescent Lamps.* (Airc. Prod., Vol. 4, No. 49, Nov., 1942, pp. 662-664.)
493	7402	Germany ...	*Hydraulic Appliance for Straightening Buckled Tubing in the Field* (*Junkers*). (El. Progresso de la Ingenieria, Vol. 20, No. 3, May, 1942, p. 60.)
494	7266	G.B.	*Activities of the Propeller and Engine Repair Auxiliary.* (Flight, Vol. 42, No. 1,773, 17/12/42, pp. 668-669.)
495	7298	G.B.	*Repair and Salvage of Aero Engines.* (Engineer, Vol. 174, No. 4,535, 11/12/42, pp. 475-477.)
			Salvage.
496	6032	G.B.	*Salvage Systems at Ford Dagenham Works.* (Airc. Eng., Vol. 14, No. 165, Nov., 1942, p. 336.)
497	7017	G.B.	*Recovering Metal from Scrap.* (H. Hartley, Nature, Vol. 150, No. 3,812, 21/11/42, pp. 594-597.)
498	7023	G.B.	*Efficient Disposal of Swarf.* (Mechanical World, Vol. 112, No. 2,916, 20/11/42, pp. 480-481.)
499	7149	Germany ...	*Compact Steel Swarf by Auto-Combustion* (*Scrap Disposal*). (Stahl und Eisen, Vol. 62, No. 44, 29/10/42, pp. 921-922.)
500	7248	G.B.	*Sampling and Pretreatment of Al. Alloy Scrap.* (E. Feuer, Metal Industry, Vol. 61, No. 25, 18/12/42, pp. 386-388.)

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				Heat.
501	5978	U.S.A.	...	*Coefficient of Expansion of Heat Resisting Silica Glass (Vycor).* (J. B. Saunders, J. Res. Bur. of Stands., Vol. 28, No. 1, Jan., 1942, pp. 51-55.)
502	5998		... ...	*Boilers—Past and Present.* (S. J. Thompson, Engineering, Vol. 154, No. 4,010, 20/11/42, pp. 418-420.)
503	6002	G.B.	... ...	*Recent Developments in Refrigeration.* (D. Gordon, Engineer, Vol. 174, No. 4,532, 20/11/42.)
504	7174	U.S.A.	...	*The Effect of Altitude on the Limits of Safe Operation of Gas Appliances (Domestic Water Heaters, etc.).* (J. H. Eisman and others, Bureau of Standards Journal of Research, Vol. 10, 1933, pp. 619-637.)
505	7218	G.B.	... ...	*Application of Physics to the Heating and Ventilation of Buildings.* (A. F. Dufton, Nature, Vol. 150, No. 3,815, 12/12/42, pp. 678-680.)
506	7225	U.S.A.	...	*A Non-Fouling H_2 Liquefier.* (E. A. Blanchard and H. W. Bittner, Rev. of Scient. Insts., Vol. 13, No. 9, Sept., 1942, pp. 394-405.)
507	7242	G.B.	... ...	*Recent Developments in Refrigeration.* (D. Gordon, Engineering, Vol. 154, No. 4,012, 4/12/42, pp. 444-446.)
508	7301	G.B.	... ...	*Recent Developments in Refrigeration.* (D. Gordon, Vol. 154, No. 4,014, 18/12/42, pp. 484-486.)
509	6084	G.B.	... ...	*Infra-Red Lamp Heating.* (F. E. Rowland, Engineering, Vol. 154, No. 4,011, 27/11/42, pp. 424-425.)
				Sound.
510	7284	G.B.	... ...	*Aircraft Noise.* (D. G. Greenwood, Flight, Vol. 42, No. 1,771, 3/12/42, pp. 615-616.)
511	7288	G.B.	... ...	*Aircraft Noise, II.* (D. G. Greenwood, Flight, Vol. 42, No. 1,772, 10/12/42, pp. 631-632.)
512	7444	G.B.	... ...	*Radiation Pattern of the Human Voice.* (Nature, Vol. 150, No. 3,811, 14/11/42, p. 583.)
				Instruments.
				Aircraft.
513	6095	G.B.	... ...	*Bubble Sextant Acceleration Errors.* (C. Williams, Aeronautics, Vol. 7, No. 5, Dec., 1942, pp. 42-43.)
514	7104	G.B.	... ...	*Rate of Climb Indicators (Manufacture and Testing of K.D.G. Instruments).* (Airc. Prod., Vol. 4, No. 50, Dec., 1942, pp. 695-700.)
515	7413	Germany	...	*A New Type of Carbon Resistance Accelerometer Fitted with Internal Damping (Covering Range 0-500 m./sec.^{2} (Digest).* (H. Niepel, Z. fur Instrum., Vol. 62, No. 10, Oct., 1942, pp. 333-334.)
516	7076	U.S.A.	...	*Improved Instrument for Measuring the Air Permeability of Fabrics.* (H. F. Schiefe and P. M. Boyland, J. Res. Bureau of Stands., Vol. 28, No. 5, May, 1942, pp. 637-642.)

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			Testing Textiles.
517	7172	U.S.A. ...	*The Flexometer (Instrument for Evaluating the Flexural Properties of Cloth).* (H. F. Schiefer, Bureau of Standards Journal of Research, Vol. 10, 1933, pp. 647-657.)
518	7178	U.S.A. ...	*The Compressometer (Comp. Resilience of Textiles).* (H. Schiefer, Bureau of Standards Journal of Research, Vol. 10, 1933, p. 705.)
			Temperature Recording.
519	5986	U.S.A. ...	*Comparison of Platinum Resistance Thermometer Between −190° and 445°C. (R.P. 1,454.)* (H. J. Hoge and F. G. Blickwedde, J. Res. Bur. of Stands.)
520	7307	G.B.	*Temperature Indicating Crayons.* (Engineering, Vol. 154, No. 4,013, 11/12/42, p. 466.)
			Electrical.
521	7011	G.B.	*Floatless Liquid Level Control.* (Electrician, Vol. 129, No. 3,364, 20/11/42, p. 549.)
522	7019	G.B.	*Overhaul of Moving Coil Meters.* (Wireless World, Vol. 48, No. 11, Nov., 1942, pp. 250-252.)
523	7147	Germany ...	*Distant Electric Control of Ship's Rudder Position (A.E.G. Adv.).* (Z.V.D.I., Vol. 86, No. 43-44, 31/10/42, p. 654.)
524	7179	U.S.A. ...	*An Apparatus for Magnetic Testing at High Magnetising Force.* (R. L. Sanford and E. C. Bennett, Bureau of Standards Journal of Research, Vol. 10, 1933, p. 567-573.)
525	7427	G.B.	*Floatless Electrical Liquid Level Indicator.* (Engineering, Vol. 155, No. 4,016, 1/1/43, p. 17.)
			Electronic.
526	7026	G.B.	*A Scanning Electron Microscope.* (V. K. Zworykin and others, A.S.T.M. Bulletin, No. 117, Aug., 1942, pp. 15-23.)
527	7125	G.B.	*Electron Lenses.* (D. Gabor, Nature, Vol. 150, No. 3,814, 5/12/42, pp. 650-652.)
528	7239	G.B.	*A Simple Electronic Switch.* (A. W. Russell, Electronic Engineering, Vol. 14, No. 178, Dec., 1942, pp. 284-285.)
529	7240	G.B.	*Electric Circuit for Testing Magnetic Materials with the Cathode Ray Oscillograph (Hysteresis Loop).* (Electronic Engineering, Vol. 14, No. 178, Dec., 1942, p. 286.)
530	7313	U.S.A. ...	*Electron Optics.* (D. Gabor, Electronic Engineering, Vol. 14, No. 178, Dec., 1942, pp. 295-299.)
531	7241	G.B.	*A Rapid X-Ray Diffraction Method (Powder Samples).* (A. T. McCord, Ind. and Eng. Chem. (Anal. Ed.), Vol. 14, No. 10, 16/10/42, pp. 793-795.)
532	7314	U.S.A. ...	*Electrical Ignition of the Spectrographic Arc.* (F. G. Brockmann and F. P. Hochgesang, Ind. and Eng. Chem. (Anal. Ed.), Vol. 14, No. 10, 16/10/42, p. 796.)

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533	7318	U.S.A. ...	*Simple Thyraton Circuit for Thermostat Regulators.* (S. Golden, Ind. and Eng. Chem. (Anal. Ed.), Vol. 14, No. 10, 16/10/42, p. 812.)
534	7350	Canada ...	*Electronic Extensometer for Creep Tests.* (Metal Industry, Vol. 61, No. 24, 11/12/42, p. 371.)
535	7412	Germany ...	*Photo Electric Microphotometer with Oscillating Image Mirror (Digest).* (S. Bodforss, Z. fur Instrum., Vol. 62, No. 10, Oct., 1942, pp. 332-333.)
536	7414	Germany ...	*Friction Measurements on Knife Edge Bearings (Digest).* (R. Vieweg and H. Zetsche, Z. fur Instrum., Vol. 62, No. 10, Oct., 1942, pp. 334-336.)
537	7418	U.S.A. ...	*Measuring Very Small Moisture or O_2 Content in H_2 (Electronic).* (P. R. Kalischer, Metal Progress, Vol. 42, No. 2, Aug., 1942, p. 233.)

Wireless.

Basic Principle.

538	7021	G.B.	*Hot Cathode Emission, III.* (M. Johnson, Wireless World, Vol. 48, No. 11, Nov., 1942, pp. 259-261.)
539	7110	G.B.	*Physical Foundation of Radio, II (Semi-Conductors, Super-Conductivity and Alloys).* (M. Johnson, Wireless World, Vol. 48, No. 10, Oct., 1942, pp. 237-239.)
540	7173	U.S.A. ...	*Cause and Elimination of Night Effects in Radio Range Beacon Reception.* (H. Diamond, Bureau of Standards Journal of Research, Vol. 10, 1933, pp. 7-34.)
541	7256	Switzerland ...	*Frequency Modulation.* (G. Guanella and J. Schwartz, Brown Boveri Review, Vol. 28, No. 12, Dec., 1941, pp. 417-422.)
542	7257	Switzerland ...	*Recent Physical Research on Atom Nuclei.* (P. Scherrer, Brown Boveri Review, Vol. 28, No. 12, Dec., 1941, pp. 436-440.)
543	7205	U.S.A. ...	*The Rheotron in Metallurgical Research (High Energy Electron Discharge as an Alternative to the Positive Ions of the Cyclotron).* (Army Ordnance, Vol. 22, No. 135, Nov.-Dec., 1942, pp. 523.)
544	7217	U.S.A. ...	*Formulas for the Skin Effect.* (H. A. Wheeler, Procs. I.R.E., Vol. 30, No. 9, Sept., 1942, pp. 412-424.)

Ultra Short Waves.

545	7020	G.B.	*Effect of Terrain Contour and Direction of Polarisation on Range of Ultra Short Waves.* (Wireless World, Vol. 48, No. 11, Nov., 1942, p. 252.)
546	7224	U.S.A. ...	*A New Direct Crystal Controlled Oscillator for Ultra Short Wave Frequencies.* (W. P. Mason, Procs. I.R.E., Vol. 30, No. 10, Oct., 1942, pp. 464-472.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
547	7252	Switzerland ...	*Valve Generators for Ultra Short Waves Based on Transit Time Control (Transator and Turbator).* (F. Ludi, Brown Boveri Review, Vol. 28, No. 12, Dec., 1941, pp. 395-396.)
548	7428	G.B.	*Progress in Short Wave Broadcasting.* (Engineering, Vol. 155, No. 4,016, 1/1/43, p. 17.)
			Military Radio.
549	7222	U.S.A. ...	*Radio Control for Model Gliders.* (J. R. Custin, Model Aeroplane News, Vol. 27, No. 4, Oct., 1942, pp. 19 and 42-46.)
550	7253	Switzerland ...	*Methods for the Automatic Scrambling of Speech (Wireless Transmission Secrecy).* (G. Guanella, Brown Boveri Review, Vol. 28, No. 12, Dec., 1941, pp. 397-408.)
551	7254	Switzerland ...	*Portable Military Wireless Equipment.* (K. Lutz, Brown Boveri Review, Vol. 28, No. 12, Dec., 1941, pp. 413-414.)
552	7255	Switzerland ...	*Aircraft Wireless (Short Wave Transmitter).* (W. Windecke, Brown Boveri Review, Vol. 28, No. 12, Dec., 1941, pp. 414-417.)
553	7357	G.B.	*German Radio Equipment (Ju. 88 and He. 111).* (Aire. Eng., Vol. 14, No. 166, Dec., 1942, pp. 342-357.)
			Abstracts.
554	6039	G.B.	*Abstracts and References (Compiled by the Radio Research Board).* (December, 1942.)
			Electricity.
555	7238	G.B.	*Manufacture of Accumulators (Ediswan).* (Electronic Engineering, Vol. 14, No. 178, Dec. 1942, p. 283.)
556	7319	U.S.A. ...	*Fluorescent Microscope Lamp.* (L. H. Berkelhamer, Ind. and Eng. Chem. (Anal. Ed.), Vol. 14, No. 10, 16/10/42, pp. 833-834.)
			Motor Transport.
			Design and Operation.
557	5981	Germany ...	*Spring Mounted Wheels as an Alternative to the Pneumatic Tyre.* (S. v. Szenasy, Motor Schau, Vol. 6, No. 9, Sept., 1942, pp. 371-374.)
558	5999	G.B.	*Railcar Oil Engine in the Argentine.* (C. B. Parker, Engineer, Vol. 174, No. 4,533, 27/11/42, pp. 437-439.)
559	7100	Germany ...	*Pistons of Modern Motor Car Engines.* (H. Schwarz, Progressus, Vol. 7, No. 1, Jan., 1942, pp. 26-32.)
560	7115	Germany ...	*Light Alloy Railway Coaches.* (Ad. M. Hug, Aluminium, Vol. 24, No. 9, Sept., 1942, pp. 307-312.)
561	7116	Germany ...	*The Utilisation of Light Alloys in Modern Transport Vehicles (Collection of Abstracts from the German Press).* (F. Reidenmeister, Aluminium, Vol. 24, No. 9, Sept., 1942, pp. 312-314.)

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562	7227	U.S.A. ...	*Car Miles per Gallon Improved by Full Throttle Operation.* (L. E. Hebl, Nat. Pet. News, Vol. 34, No. 42, 21/12/42, pp. 30-32.)
563	7229	S. America ...	*Railcar Oil Engine in the Argentine.* (C. R. Parker, Engineer, Vol. 174, No. 4,534, 4/12/42, pp. 464-466.)
564	7299	S. America ...	*Railcar Oil Engines in the Argentine.* (C. R. Parker, Engineer, Vol. 174, No. 4,535, 11/12/42, pp. 483-486.)
565	7408	U.S.A. ...	*Tubeless Tyre for Transport Vehicles.* (Nat. Pet. News, Vol. 34, No. 45, 11/11/42, p. 8.)
566	7462	U.S.A. ...	*The Use of Expander Rings to Prevent Excessive Cylinder Reconditioning (Digest).* (P. E. Friend, S.A.E.J., Vol. 50, No. 11, Nov., 1942, pp. 35 and 57-58.)
			Alternative Fuel and Gas Generators.
567	5982	Sweden ...	*New Swedish Mobile Gas Generators.* (R. Otte, Motor Schau, Vol. 6, No. 10, Oct., 1942, pp. 402-408.)
568	6099	G.B.	*Alternative Fuels.* (Autom. Eng., Vol. 32, No. 429, Nov., 1942, pp. 423-432.)
569	7000	G.B.	*Modified Government Gas Producer, Type P.S.V.* (Autom. Eng., Vol. 32, No. 429, Nov., 1942, pp. 433-437.)
570	7001	G.B.	*B.C.U.R.A. Producer (British Coal Utilisation Research Association).* (Autom. Eng., Vol. 32, No. 429, Nov., 1942, pp. 437-438.)
571	7002	G.B.	*The Bellay Gas Producer.* (Autom. Eng., Vol. 32, No. 429, Nov., 1942, pp. 439-446.)
572	7003	... ...	*B.V.P. Gas Producer (British Vehicle Producer Gas, Ltd.).* (Autom. Eng., Vol. 32, No. 429, Nov., 1942, pp. 446-449.)
573	7004	G.B.	*Cowan Producer.* (Autom. Eng., Vol. 32, No. 429, Nov., 1942, pp. 449-456.)
574	7005	G.B.	*Emers—Sentinel Gas Producer.* (Autom. Eng., Vol. 32, No. 429, Nov., 1942, pp. 453-456.)
575	7006	G.B.	*H.M.L. Gas Producer (Hamilton Motors, Ltd.).* (Autom. Eng., Vol. 32, No. 429, Nov., 1942, pp. 456-458.)
576	7001	... ...	*H.S.G. Gas Producer.* (Autom. Eng., Vol. 32, No. 429, Nov., 1942, pp. 458-462.)
577	7008	G.B.	*Government Gas Producer Mark VI (Light Commercial Vehicles).* (Autom. Eng., Vol. 32, No. 429, Nov., 1942, pp. 462-463.)
578	7009	G.B.	*C. and W. Gas Producers for Small Cars.* (Autom. Eng., Vol. 32, No. 429, Nov., 1942, pp. 463-464.)
579	7196	G.B.	*Effect of Compression Ratio on Performance with Producer Gas.* (J. Spiers and E. Giffen, Autom. Eng., Vol. 32, No. 431, Dec., 1942, pp. 523-527.)
580	7369	Germany ...	*Increased Use of Liquid Gas (Propane and Lutane) for Transport Vehicles.* (Ind. and Eng. Chem. (News Ed.), Vol. 20, No. 20, 25/10/42, p. 1,313.)
581	7410	Germany ...	*Mobile Producer Gas Plant (Charcoal).* (W. Heller, El Progresso de la Ingenieria, Vol. 23, No. 3, May, 1942, pp. 41-46.)

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582	7145	U.S.S.R. ...	*Russian Roads in Winter* (*Coping with Snowdrifts, Methods of Clearing Snow, Construction of Special Snow Roads, etc.*). (B. Wehner, Z.V.D.I., Vol. 86, No. 43-44, 31/10/42, p. 654.)
583	7409	U.S.A. ...	*Canvas Bag Containers for Rail Transport of Motor Fuels.* (Nat. Pet. News, Vol. 34, No. 45, 11/11/42, No. 26.)
584	7431	G.B.	*Armoured Fighting Vehicles in* 1942. (Engineer, Vol. 175, No. 4,538, 1/1/43, pp. 15-19.)
			Meteorology.
585	5995	G.B.	*The Minnesota Dust Counter* (*Impingement Type*) *Microfilms.* (Engineering, Vol. 154, No. 4,010, 20/11/42, pp. 401-404.)
586	7074	U.S.A. ...	*Measurement of Ultra Violet Solar and Sky Radiation Intensities in High Latitudes.* (W. W. Coblentz and others, J. Res. Bureau of Stands., Vol. 28, No. 5, May, 1942, pp. 581-591.)
587	7219	G.B.	*The Temperature of the Atmosphere* (*Digest*). (T. G. Couling, Nature, Vol. 150, No. 3,815, 12/12/42, pp. 636-687.)
588	7303	G.B.	*Atmospheric Pollution.* (Engineering, Vol. 154, No. 4,014, 18/12/42, p. 495.)
589	7447	Germany ...	*The Effect of Atmospheric Haze on the Camouflaging of Aerial Targets.* (F. Lohle, Luftwissen, Vol. 9, No. 9, Sept., 1942, pp. 258-262.)
			Physiology and Aviation Medicine.
590	7157	Germany ...	*Smoke Poisoning* (*Cause and Nature*). (D. Leu, Z.G.S.S., Vol. 37, No. 9, Sept., 1942, pp. 174-176.)
591	7160	Germany ...	*Carbon Dioxide Breathing at High Altitudes and its Effect on Oxygen Want.* (A. Ruhl and W. Spiess, Luftfahrtmedizin, Vol. 1, No. 4, 24/4/37, pp. 272-291.)
592	7161	Germany ...	*Pulse Rate and Blood-Pressure as Affected by Gradually Decreasing and Increasing Pressures in the Low Pressure Chamber.* (G. Besseres, Luftfahrtmedizin, Vol. 1, No. 4, 24/4/37, pp. 301-306.)
593	7162	Germany ...	*The Time Reserve of Human Beings After Interruption of the Oxygen Supply at High Altitudes.* (Luftfahrtmedizin, Vol. 3, No. 1, 1938-1939, pp. 55-63.)
594	7163	Germany ...	*On the Causes and Prevention of Severe Internal Injuries in Gliding Accidents. The Problem of the Capacity of the Body to Endure Extreme Impact Shock is also Discussed.* (Luftfahrtmedizin, Vol. 3, No. 2, 1938-1939, pp. 267-276.)
595	7164	Germany ...	*The Oxygen Saturation of the Blood when Breathing CO at High Altitudes.* (H. Diringshofen, Luftfahrtmedizin, Vol. 3, No. 2, 1938-1939, pp. 216-217.)

ITEM NO.	R.T.P. REF.			TITLE AND JOURNAL.
596	7165	Germany	...	*On the Problem of Acclimatization to Oxygen Deficiency at Low Pressure.* (H. Kaltze and W. Kuhn, Luftfahrtmedizin, Vol. 3, No. 2, 1938-1939, pp. 183-190.)
597	7166	Germany	...	*Development of Abnormal Symptoms in the Lungs and Heart as a Result of Adaptation to Flying Conditions.* (Luftfahrtmedizin, Vol. 3, No. 2, 1938-1939, pp. 104-115.)
598	7226	G.B. ...	...	*The Functions and Performance of the Eye.* (W. D. Wright, J. Scient. Insts., Vol. 19, No. 11, Nov., 1942, pp. 161-165.)
599	7325	G.B. ...	...	*British Research in Aviation Medicine.* (Times Trade and Engineering, Vol. 52, No. 945, Nov., 1942, p. 35.)
600	7494	U.S.A.	...	*The Syndrome of Hyperventilation. Its Importance in Aviation. (H. C. Hinshaw, Procs. Staff Meeting of Mayo Clinic, 1941, Vol. 16, No. 14, pp. 211-213.)* (Bulletin of War Medicine, Vol. 2, No. 6, July, 1942, p. 512.)
601	7495	Germany	...	*Oxygen Deficiency in the Cerebral Circulation (Noell-Schnieder, Luftfahrtmed., Aug. 30, 1941, Vol. 5, Pt. 3, p. 234.)* (Bulletin of War Medicine, Vol. 2, No. 6, July, 1942, p. 512.)
602	7496	U.S.A.	...	*The Cardiovascular Aspects of Aviation Medicine. (J. R. Poppen, New England J. of Med., Vol. 225, No. 23, Dec. 4, 1941, pp. 892-896.)* (Bulletin of War Medicine, Vol. 2, No. 6, July, 1942, pp. 512-513.)
603	7497	G.B. ...	...	*The Use of the Tilt-Table Test in Aviation Medicine. (A. Graybiel and R. A. McFarland, J. Aviation Med., Vol. 12, No. 3, 1941, pp. 194-211.)* (Bulletin of War Medicine, Vol. 2, No. 6, July, 1942, p. 513.)
604	7498	G.B. ...	...	*Recent Trends in Aviation Medicine. (J. R. Poppen, J. of Aviation Med., Vol. 12, No. 1, March, 1941, pp. 57-71.)* (Bulletin of War Medicine, 1941, p. 509.)
605	7499	Germany	...	*Influence of Tangential Forces on the Human Organism. (S. Ruff, Wien. Klin. Wach., Vol. 52, Sept. 15, 1939, p. 861.)* (Bulletin of War Medicine, Vol. 2, No. 6, July, 1942, pp. 509-510.)
606	7500	G.B. ...	...	*A Mask Apparatus which Provides High Oxygen Concentrations with Accurate Control of the Percentage of Oxygen in the Inspired Air without Accumulation of Carbon Dioxide. (A. L. Barach and M. Eckman, J. Av. Med., Vol. 12, No. 1, March, 1941, pp. 39-52.)* (Bull. of War Med., Vol. 2, No. 6, July, 1942, p. 511.)
607	7501	G.B. ...	...	*Special Problems of the R.C.A.F. Medical Officer. (G. E. Hall, Canadian Med. Ass. J., Vol. 45, No. 5, Nov., 1941, pp. 387-390.)* (Bulletin of War Medicine, Vol. 2, No. 6, July, 1942, pp. 511-512.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
608	7502	U.S.A. ...	*The Importance of the "Nervous Energy Reserve" in Aviation.* (*M. N. Walsh, Procs. Staff Meeting Mayo Clinic, Vol. 6, No. 45, Nov., 1941, pp. 709-714.*) (Bulletin of War Medicine, Vol. 2, No. 6, July, 1942, p. 516.)
609	7503	Germany ...	*Neurologic and Psychologic Aspects of Aviation Medicine. A Review of the Literature.* (*H. Lottig, Fortschr. d. Neurol. Psychiat., Vol. 11, Nov., 1939, pp. 441-454.*) (Bulletin of War Medicine, Vol. 2, No. 6, July, 1942, pp. 516-518.)
610	5704	Germany ...	*Biologic Effect of High Altitude from the Point of View of Aviation.* (*H. Strughold, Wien. Klin. Woch., Vol. 52, Sept., 1939, p. 857.*) (Bulletin of War Medicine, Vol. 2, No. 6, July, 1942, pp. 519-520.)
611	7505	Hungary ...	*Sudden Turning of the Head as a Cause of Sudden Death in Flyers.* (*Orsaferene Orsovi-Hetilap, Hungary, 1940, p. 554.*) (Bulletin of War Medicine, Vol. 2, No. 6, July, 1942, p. 521.)
612	7506	Italy	*Changes in Altitude Resistance Through Alterations of the Acid-Base Balance in the Blood.* (*Margaria and Faraglia, Bull. Soc. ital. Biol. sper., Vol. 15, 1940, p. 1,096.*) (Bulletin of War Medicine, Vol. 2, No. 6, July, 1942, p. 513.)
613	7507	Spain ...	*Arterial Blood Pressure in Pilots.* (*Vega Herrera, Semana Med., Vol. 46, Oct., 1939, p. 981.*) (Bulletin of War Medicine, Vol. 2, No. 6, July, 1942, p. 513.)
614	7508	Germany ...	*Circulatory Collapse during Great Acceleration in Airplanes.* (*S. Ruff, Med. Klin., Vol. 26, Jan., 1940, p. 69.*) (Bulletin of War Medicine, Vol. 2, No. 6, July, 1942, p. 514.)
615	7509	Germany ...	*Increased Danger in Circulatory Collapse Due to Simultaneous Action of Altitude and Acceleration in Airplanes.* (*Verhandl. d. deut. Gesellsch. f. Kreislaufforsch., Vol. 13, 1940, p. 92.*) (Bulletin of War Med., Vol. 2, No. 6, July, 1942, pp. 515-516.)
616	7511	U.S.A. ...	*The Ear in Flying.* (*J. R. Poppen, Laryngoscope, Vol. 51, No. 10, Oct., 1941, pp. 974-982.*) (Bulletin of War Medicine, Vol. 2, No. 6, July, 1942, p. 521.)
617	7512	U.S.S.R. ...	*Changes in the Excitability of the Vestibular Apparatus following Repeated Stimulation-Significance for Aviators.* (*O. M. Frenkel, Bull. Biol. et Med. exper., Vol. 9, p. 69.*) (Bulletin of War Medicine, Vol. 2, No. 6, July, 1942, pp. 521-522.)
618	7513	Germany ...	*Muscosal Detachment of Paranasal Sinuses in Aviators.* (*A. Hermann, Luftfahrtmedizin, Vol. 5, No. 3, 1941, pp. 271-277.*) (Bulletin of War Medicine, Vol. 2, No. 6, July, 1942, p. 522.)
619	7514	G.B.	*Differences in Judgment of Depth Perception Between Stationary and Moving Objects.* (*R. Y. Walter, J. Aviation Med., Vol. 12, No. 3, 1941, pp. 218-225.*) (Bulletin of War Medicine, Vol. 2, No. 6, July, 1942, pp. 522-523.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
620	7515	India ...	*Dark Adaptation Tests in Cases of Clinical Night Blindness.* (*K. Rajagopal, Indian J. Med. Res., Vol. 29, No. 2, April,* 1941, *pp.* 351-360.) (Bulletin of War Medicine, Vol. 2, No. 6, July, 1942, p. 523.)
621	7516	G.B.	*Vitamin A and Dark Adaptation: Effect of Alcohol, Benzedrene and Vitamin C.* (*S. Yudkin, Lancet, Dec.* 27, 1941, *pp.* 787-791.) (Bulletin of War Medicine, Vol. 2, No. 6, July, 1942, p. 524.)
622	7517	Germany	*Gastric Disorders in Flying Personnel.* (*R. Mallison, Deut. Militarant, Vol.* 5, *Oct.*, 1940, *pp.* 411-413.) (Bulletin of War Medicine, Vol. 2, No. 6, July, 1942, pp. 524-525.)
623	7518	U.S.A. ...	*Parachute Injuries.* (*W. J. Tobin and others, J. Am. Med. Ass., Vol.* 117, *No.* 16, *Oct.* 18, 1941, *pp.* 1,318-1,321.) (Bulletin of War Medicine, Vol. 2, No. 6, July, 1942, p. 525.)
624	7519	G.B.	*Hours of Work, Lost Time and Labour Wastage.* (*Med. Res. Council Indust. Health Res. Board, Emergency Report No. 2, p. 26,* 1942. *London, H.M.S.O.*, 6*d.*) (Bulletin of War Medicine, Vol. 2, No. 6, July, 1942, pp. 525-526.)
625	7521	G.B.	*Preventive Work in Connection with T.N.T. Poisoning, pp.* 177-180. (*Ministry of Munitions of War, Official History of the Scottish Filling Factory (No. 4 National), Georgetown, Renfrewshire,* 1919.) (Bulletin of War Med., Vol. 2, No. 6, July, 1942, p. 527.)
626	7522	Germany ...	*Occupational Diseases of the Skin.* (*A. M. Memmesheimer, Med. Klin., Vol.* 38, *No.* 3, *Jan.* 16*th*, 1942, *pp.* 53-54.) (Bulletin of War Medicine, Vol. 11, No. 6, July, 1942, p. 528.)
627	7523	G.B.	*A New Colorimetric Method for the Determination of T.N.T.* (2, 4, 6, *Trinitrotoluene*) *in Air.* (*S. S. Pinto and J. P. Fahy, J. Industrial Hyg. and Toxicl., Vol.* 24, *No.* 2, *Feb.*, 1942, *pp.* 24-26.) (Bulletin of War Med., Vol. 2, No. 6, July, 1942, pp. 528-529.)
628	7524	G.B.	*Luminous Paints, Protection of Workpeople.* (*Lancet, May* 23, 1942, *pp.* 628-629.) (Bulletin of War Medicine, Vol. 3, No. 4, Dec., 1942, p. 235.)
629	7525	U.S.A. ...	*Clinical and Sub-Clinical Lead Intoxication.* (*H. E. Abraham and J. A. Baird, War Med., Chicago, Vol.* 2, *No.* 3, *May*, 1932, *pp.* 450-453.) (Bulletin of War Medicine, Vol. 3, No. 4, Dec., 1942, p. 235.)
630	7526	G.B.	*The Examinations and Selection of Aviators.* (*L. H. Bauer, New International Clinics, Vol.* 1 (*N.S.*5), 1942, *pp.* 1-15.) (Bulletin of War Medicine, Vol. 3, No. 4, Dec., 1942, p. 232.)
631	7527	G.B.	*The Psychological Aspects of Flying, with Special Reference to Problems of Selection.* (*R. A. Macfarland, New International Clinics, Vol.* 1 (*N.S.*5), 1942, *pp.* 16-34.) (Bulletin of War Med., Vol. 3, No. 6, Dec., 1942, p. 232.)

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632	7528	G.B.	*The Effects of Altitude on the Flyer.* (*H. G. Armstrong, New International Clinics, Vol. 1 (N.S.5), 1942, pp. 35-45.*) (Bulletin of War Medicine, Vol. 3, No. 6, Dec., 1942, p. 232.)
633	7529	G.B.	*The Physical Maintenance of the Pilot.* (*A. D. Tuttle, New International Clinics, Vol. 1 (N.S.5), 1942, pp. 46-59.*) (Bulletin of War Medicine, Vol. 3, No. 6, Dec., 1942, p. 232.)
634	7530	G.B.	*The Effects of Cold and High Speed on the Flyer.* (*J. R. Coppen, New International Clinics, Vol. 1 (N.S.5), 1942, pp. 60-67.*) (Bulletin of War Medicine, Vol. 3, No. 6, Dec., 1942, p. 232.)
635	7531	Australia ..	*Medical Problems in Practical Flying.* (*S. M. L. Dunstone, Med. J., Australia, Vol. 1, No. 14, April 4th, 1942, pp. 397-400.*) (Bulletin of War Medicine, Vol. 3, No. 6, Dec., 1942, p. 231.)
636	7532	G.B.	*The Compensatory Mechanism of the Splanchnic Circulation During Changes of Posture.* (*O. G. Edholm, J. Physiology, Vol. 101, No. 1, June 2, 1942, pp. 1-10.*) (Bulletin of War Medicine, Vol. 3, No. 4, Dec., 1942, p. 231.)
637	7533	G.B.	*The Effect of Flight Upon Hearing.* (*P. A. Campbell, J. Aviation Med., Vol. 13, No. 1, March, 1942, pp. 56-60.*) (Bulletin of Medicine, Vol. 3, No. 4, Dec., 1942, pp. 231-232.)
638	7534	Germany ...	*Testing of Night Vision by the Nyktometer.* (*R. Braun, Deut. Militararzt, Vol. 7, No. 1, Jan., 1942, pp. 31-35.*) (Bull. of War Medicine, Vol. 111, No. 4, Dec., 1942, p. 232.)
639	7535	G.B.	*The Personal Factor in Accidents.* (*Medical Research Council, Indust. Health Research Board, Emergency Report No. 3, pp. 92, 1942. London, H.M.S.O., 4d.*) (Bulletin of War Med., Vol. 3, No. 4, Dec., 1942, pp. 222-223.)
640	7536	U.S.A. .	*Industrial Hygiene in Aircraft Plants.* (*Calif. State Dept. of Health Weekly Bull., Vol. 20, Jan. 10th, 1942, p. 203.*) (Bulletin of War Medicine, Vol. 111, No. 4, Dec., 1942, pp. 233-234.)
641	7537	G.B.	*The Physiologic Action of Metallic Magnesium.* (*S. F. Meek and others, J. Indust. Hyg. and Toxic., Vol. 24, No. 6, June, 1942, pp. 42-47.*) (Bulletin of War Medicine, Vol. 3, No. 4, Dec., 1942, p. 234.)
642	7538	G.B.	*Wounds Caused by Magnesium Fragments.* (*R. Z. Schulz and C. W. Walter, J. Indust. Hyg. and Toxicol., Vol. 24, No. 6, June, 1942, pp. 148-153.*) (Bulletin of War Medicine, Vol. 3, No. 4, Dec., 1942, p. 234.)
643	7539	U.S.A. ...	*Occupational Hazards to Young Workers, Report No. 6, Radioactive Substances.* (*U.S. Dept. of Labour, Children's Bureau, March 4, 1942, pp. 20.*) (Bulletin of War Medicine, Vol. 3, No. 4 Dec., 1942, p. 234.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
644	7540	G.B.	*Ventilation Requirements for Radium Dial Painting.* (*W. C. L. Hemeon and R. D. Evans, J. Indust. Hyg. and Toxicol., Vol. 24, No. 5, May, 1942, pp.* 116-120.) (Bulletin of War Medicine, Vol. 3, No. 4, Dec., 1942, pp. 233-234.)
645	7541	U.S.A. ..	*Physiology and High Altitude Flying: With Particular Reference to Air Embolism.* (*J. F. Fulton, Science, Feb. 27, 1942, pp.* 207-212.) (Bulletin of War Medicine, Vol. 3, No. 3, Nov., 1942, p. 175.)
646	7542	U.S.A. ...	*Oxygen Supply Systems for Military Flying.* (*J. R. Pappen, Bull. New York Acad. Med., Vol.* 18, *No. 2, Feb., 1942, pp.* 102-111.) (Bulletin of War Medicine, Vol. 3, No. 3, Nov., 1942, pp. 175-176.)
647	7543	U.S.A. ...	*The Problem of Deafness in Aviators.* (*C. C. Bunch, War Medicine, Chicago, Vol.* 1, *No.* 6, *Nov., 1941, pp.* 873-886.) (Bulletin of War Medicine, Vol. 3, No. 3, Nov., 1942, p. 176.)
648	7544	G.B.	*Some Limitations of the Electrocardiogram in the Physical Examination for Flying.* (*C. E. Kossmann, J. Av. Med., Vol.* 13, *No.* 1, *March, 1942, pp.* 26-34.) (Bulletin of War Med., Vol. 3, No. 3, Nov., 1942, p. 177.)
649	7545	G.B.	*Miniature Mass Radiography in the R.A.F. Review of* 20,000 *Exams.* (*R. R. Trail, Lancet, May* 27*th, 1942, pp.* 609-610.) (Bulletin of War Medicine, Vol. 3, No. 3, Nov., 1942, p. 177.)
650	7546	U.S.A. ...	*A Note on the Hygroscopic Properties of Clothing in Relation to the Human Heat Loss.* (*J. H. Nielbach and L. P. Herrington, Science, April* 10*th, 1942, pp.* 387-388.) (Bull. of War Med., Vol. 3, No. 3, Nov., 1942, pp. 178-179.)
651	7450	Germany ...	*A Comparison of Direct and Alternating Current Supply in Aircraft on the Basis of Danger of Electrocution.* (H. Viehmann, Luftwissen, Vol. 9, No. 9, Sept., 1942, pp. 268-269.)
			Photography.
652	5996	G.B.	*Microfilms in the Library.* (Engineering, Vol. 154, No. 4,010, 20/11/42, p. 412.)
653	7010	U.S.A. ...	*Characteristics of Wide Angle Aeroplane Camera Lenses.* (*R.P.* 1,498.) (E. Washer, J. Res. Bureau of Stands., Vol. 29, No. 3, Sept., 1942, pp. 233-246.)
654	7025	G.B.	*"Recordak" System of Microfilming.* (Mechanical World, Vol. 112, No. 2,916, 20/11/42, p. 487.)
655	7008	Germany ...	*Aerial Photogrammetry (Representative Camera and Rectification Apparatus).* (H. Belzner, Progressus, Vol. 7, No. 1, Jan., 1942, pp. 12-17.)
656	7146	Germany ...	*Photographic Reproduction and Storing of Engineering Drawings (Scale Reduction* 1/10 *Considered as a Maximum).* (H. Penther, Z.V.D.I., Vol. 86, No. 43-44, p. 661.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
657	7177	U.S.A. ...	*Photographic Reversal by Desensitizing Dyes.* (B. H. Carrol and C. M. Kretchman, Bureau of Standards Journal of Research, Vol. 10, 1933, pp. 449-464.)
658	7220	G.B.	*Scientific Films in Teaching Physics.* (Nature, Vol. 150, No. 3,815, 12/12/42, p. 691.)
			Mathematics.
659	7411	Germany ...	*Definition of Physical Quantities by Means of "Descriptive" Equations.* (R. Thun, Z. fur Instrum., Vol. 62, No. 10, Oct., 1942, pp. 305-311.)
660	6033	G.B.	*Lagrangian Frequency Equations.* (J. Morris and J. W. Head, Airc. Eng., Vol. 14, No. 165, Nov., 1942, pp. 312-314 and 319.)
661	7014	G.B.	*Machine for Rapid Summation of Fourier Series.* (D. Macewan and C. A. Beevers, Rev. of Scientific Insts., Vol. 19, No. 10, Oct., 1942, pp 150-156.)
			University Training.
662	5979	G.B.	*Some Notes and Suggestions on the Teaching of Physics.* (C. T. Smith, Phil. Mag., Vol. 33, No. 228, Nov., 1942, pp. 775-815.)
663	6036	G.B.	*The Value of Library Research.* (L. Mote, Airc. Eng., Vol. 14, No. 165, Nov., 1942, p. 320.)
664	7142	Germany ...	*Co-ordination of Studies at German Universities and Technical High Schools. New Degrees of "Diploma Physicist" on "Diploma Mathematician."* (Z.V.D.I., Vol. 86, No. 43-44, 31/10/42, p. 652.)
665	7308	G.B.	*Engineer or Physicist?* (P. Dunsheath, Engineering, Vol. 154, No. 4,013, 11/12/42, p. 474.)

ABSTRACTS FROM THE SCIENTIFIC AND TECHNICAL PRESS.

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NOTE.—As far as possible, the country of origin quoted in the items refers to the original source.

Ionisation as a Factor in Fluid Mechanics. (F. W. Durand, Kármán Anniversary Volume of Applied Mechanics, 1941, pp. 76-84.) (109/1 U.S.A.)

The factors controlling the behaviour of a fluid in relative motion with solid boundaries have usually been taken as follows:—

(1) The geometry of the solid boundaries.
(2) The surface character of these boundaries.
(3) The density of the fluid.
(4) The viscosity of the fluid.
(5) The velocity of the fluid relative to the boundaries.

The important question here is, however, the mutual force reactions between adjacent unities of the fluid, whether these unities be considered as individual molecules, or as groups or bundles of molecules. In any case we may gain a suitable approach to the present problem by taking the individual molecule as unit of fluid movement.

It does not appear simple to estimate with any degree of assurance the particular direction in which the influence of ionisation should influence these various features of fluid motion. To the extent to which greater intermolecular forces are in play, greater energies will be involved, with presumably greater transfers of such energy and momentum and with correspondingly increased coefficients of

drag. It is not easy to see in what direction ionization might affect the break from laminar flow to turbulent flow, or the characteristic that has been called the " grain " of turbulence, or the point of separation from a convex surface such as a sphere—at least until what may be called the mechanics of these characteristics of fluid motion are better understood than at present.

It may be that all of these affects are too small to be of any practical significance, perhaps too small to be measurable or observable with any means now at our disposal. The possibility of such effects and the possibility that they might be observable, perhaps measurable and of some practical significance, seems at least a sufficient reason for some experimental investigation looking toward the furnishing of further light on the question here raised.

To this end it may be suggested that some study is needed of the flow behaviour of highly ionised air about a thin plane and about a sphere, controlled by measurements of neutral air about the same geometrical forms, other conditions the same.

Isotropic Turbulence in Theory and Experiment. (H. L. Dryden, Kármán Anniversary Volume of Applied Mechanics, 1941, pp. 85-102.) (109/2 U.S.A.)

At the 5th International Congress for Applied Mechanics a Turbulence Symposium organised by Prandtl gave much attention to the statistical theory of isotropic turbulence, to which subject von Kármán has made many important contributions. A large part of the general lecture by G. I. Taylor was devoted to a review of theoretical and experimental developments in the study of isotropic turbulence, in the course of which some unpublished experimental results of Hall on the decay of isotropic turbulence behind screens in a wind tunnel were compared with the published results of similar measurements at the National Bureau of Standards. At the Congress von Kármán summarized the main results of his analysis of the correlation theory for the case of isotropic turbulence and also gave some experimental results on the decay of isotropic turbulence behind screens. The experimental results from the three sources, although each self-consistent by many checks, showed rather larger discrepancies, which have not as yet been fully explained.

A slight extension of von Kármán's theory leads to interesting results. However, the existence of discrepancies in the experimental results makes it difficult to distinguish clearly between various theoretical predictions. Further experimental work has thrown some light on the probable causes of the discrepancies although no major experimental programme has been possible. This paper describes these developments.

The discrepancies are discussed in relation to the systematic errors arising from (1) the finite length of the hot wires used for the measurements, (2) the cut-off frequency of the amplifier, and (3) the variation in heating current produced by changes in resistance of the wire associated with the turbulent velocity fluctuations. A part of the discrepancy is believed to arise from the influence of the construction details and surface roughness of the screens and of the turbulence of the airstream in which the screens are placed. Further experimental work will be required to answer many questions that arise.

Fluid Motion Inside Rotating Radial Impellers. (E. Grunagel, V.D.I., Forschungsheft, No. 405, December, 1940, pp. 1-21.) (109/3 Germany.)

Experiments were carried out on a variety of radial impeller forms with cylindrical blades 400-500 mm. in diameter immersed in a water tank and rotated by means of an electric motor. Elaborate precautions were taken to obtain steady flow conditions both at entry and exit (guide vanes), the flow being either towards the centre of the impeller (turbine) or in the reverse direction (pump). The blades just projected above the surface of the water (constant level) and the flow was examined by means of a rotating mirror or photographed by means

of a camera rotating with the impeller, the flow line being rendered visible either by sprinkling the surface with Al. powder or introducing coloured filaments below the surface. Special attention was paid to phenomena in the gap between impeller and guide vanes. The experiments covered a large variation of blade angles and flow conditions, including shock at entry. Over 1,000 photographs were taken, of which a representative selection is reproduced. It appears that for the same type of impeller, the flow is much more irregular when pumping than when acting as a turbine. In the former case the rotating channels are only partly filled with true fluid jets, the remainder of the passage being occupied with turbulent eddies. This is especially marked with partial admission but persists also in many cases with full admission (shock free entry). In the case of pumps, the fluid jets generally follow the contour of the blade front if the admission is below normal, but adhere to the back of the blade if the admission is excessive. In case of turbine blades with small exit angles, the flow tends to separate from the blade front and leave the impeller in a more radial direction. Evidently the suction at the trailing edge is insufficient to ensure a further reduction in the velocity moment. In each case regions of excessive turbulence caused axial deviation of the jet and obstructed its free passage. Such obstructions are, however, not only due to separation of the flow (break away of boundary layer). As is well known, theory indicates a velocity gradient at right angles to the flow in the rotating impeller passage, the velocity being least in the neighbourhood of the blade front. Under certain circumstances the flow in these regions should even become negative, i.e. a reversal of flow takes place along the front edge of the blade. We thus have a second cause for obstruction of the free passage of the jet which was confirmed by flow photographs. In the majority of cases, however, no reversal of flow could be observed, the region in question simply becoming turbulent.

Another type of flow reversal occurs with pump impellers at low admission. This is known as surging or pulsating flow and seems to originate in the clearance gap between rotor and diffusor. The disturbance travels along the diffuser at about $\frac{1}{3}$ to $\frac{1}{8}$ rotor speed and in extreme cases the flow reversal may project up to the impeller intake. The total rate of delivery is not necessarily affected by this phenomenon, reduced speeds over one section of the impeller being balanced by excess velocities in others.

The cause of these pulsations is still obscure. The experiments indicate, however, that such flow reversals can be controlled by reducing the number of impeller blades. Rearward curvature of the blades is also beneficial in preventing the pulsations from reaching the rotor intake and causing a serious drop in efficiency.

In the concluding section of his paper, the author attempts to elucidate some of these phenomena theoretically, and it is interesting to note that flow pulsations over the circumference of the impeller can apparently also arise in the case of ideal fluids.

Simple expressions for the turbulent friction between fluid layers at different velocities are also derived which enable the energy transformation in the pump to be followed more closely. It may ultimately be possible to calculate the power consumption and delivery head under partial admission provided more experimental data on the turbulent friction coefficient become available.

A useful bibliography (21 items) covering recent investigations on centrifuge pumps is given.

Some Two-Dimensional Aspects of the Ejector Problem. (J. A. Goff and C. N. Coogan, J. App. Mech., Vol. 9, No. 4, Dec., 1942, pp. 151-154.) (109/4 U.S.A.)

Several investigators have attempted to analyze the performance of the ejector on a one-dimensional basis. Some doubt exists whether such analyses can lead to a rational ejector design because of the questionable validity of certain necessary assumptions. Recently, consideration has been given to the two-

dimensional aspects of the problem, and while a rational design has not yet been evolved, the results attained seem to point in the right direction. The theory of turbulent mixing in jets, developed by Tollmien is used as the basis of the study reported in this paper. Tollmien's analysis of the mixing zone produced by a homogeneous air stream issuing into still air of the same pressure and density is reviewed.

On the basis of this theory the ratio α of the mass rates of flow of driven to driving fluid is a numerical constant (.387) and independent of the velocity of the driving fluid, provided the densities of the two fluids are the same.

Making reasonable assumptions, the author extends this theory to include difference of density, and shows that α diminishes from .387 to .25 as the ratio of densities of driving to driven fluids increase from 1 to 2.

Experimental measurements with an apparatus designed to conform as closely as possible with the 2 dimensional boundary conditions of Tollmien, gave a velocity distribution in satisfactory agreement with theory and a value of $\alpha = .38$.

The author suggests that the present theory will ultimately be satisfactory for design, but much additional experimentation will be required.

Theory of Heat Transfer in Smooth and Rough Pipes. (G. D. Mattioli, Forschung, Vol. 11, No. 4, July-August, 1940, pp. 149-158.) (T.M. 1,037.) (109/5 Italy.)

Heat transfer in turbulent flow has been investigated on the basis of moment transfer (Prandtl) or vorticity transfer (Taylor).

The author points out that a large difference exists between molecular and turbulent motions. Whilst the former can be satisfactorily treated on the basis of linear momentum, the units partaking in turbulent motion are so large that both their linear and angular momentum must be considered.

On this basis, the author obtains an expression for the heat transfer in smooth tubes (as a function of Pr and Re numbers) which becomes asymptotic at $Re \to \infty$ and is in satisfactory agreement with the available experimental data.

The use of this formula is illustrated in a worked-out example for water at a mean temperature of 50°C. flowing through a 3 cm. pipe at 100 cm./sec., wall temperature 100°C. Under these conditions $\alpha = 6{,}120$ k cal./m.^{2} in °C.

In the case of rough tubes, the heat transfer coefficient is shown to be a function of kv_*/γ where $v_* =$ so-called friction velocity at wall. $k =$ mean height of roughness elements. Two further empirical constants which appear in the formula cannot as yet be evaluated due to lack of experimental data.

The Performance of a Vaneless Diffusor Fan. (V. Polikosky and M. Nevelson, Reprint No. 224, C.A.H.I., Moscow, 1935.) (R.T.P. Translation T.M. 1,038.) (109/6 U.S.S.R.)

In the case of a centrifugal fan the flow path in the vaneless diffusor depends on the impeller design and operating conditions. Generally speaking, the path should be made as short as possible so as to reduce pressure losses, and for this reason the velocity at the entry to the diffusor should be radial. As is well known, the air on leaving the impeller follows a spiral path in the absence of friction. The author shows that due to friction on the walls of the diffusor, the spiral unrolls at a more rapid rate and the exit angle at the diffusor is increased. It is interesting to note that this increase in the angle α is directly proportional to the product of the resistance coefficient λ and the radius.

Assuming a value $\lambda = 0.05$ for smooth surfaces, the author shows, by means of a worked out example, how to determine the static pressure at the diffusor exit on the assumption that—

1. The flow fills the entire exit cross-section of the impeller.
2. The diffusor is of constant width and equal to that of the impeller.

The results are in very satisfactory agreement with experiments on a particular fan, the difference between calculated and observed static head being less than 1 mm. of water for static pressure between 78 and 50 mm. corresponding to flow rates ranging from 300 to 700 m.^{3}/h. In this case the loss in head due to friction in the vaneless diffusor amounts to 18.2 mm. at 300 m.^{3}/h. and 10.7 mm. at 700 m.^{3}/h. respectively.

The advantages of the vaneless diffusor are its simplicity and the fact its efficiency is reasonable over a large working range. Its main disadvantage is the relatively large space required. In all cases, therefore, where compactness is a deciding factor, vanes must be employed. Such vaned diffusors, besides being less bulky, will generally have a slightly higher efficiency when operating under designed conditions. For flow rates departing markedly from the normal, however, the shock and separation losses at the blades render such diffusors less efficient than the vaneless type.

In conclusion, the author extends his method to cover the case of vaneless diffusors for axial flow fans and, in a further worked-out example, gives calculated values for the static head. Comparison with experimental results is again satisfactory, although the agreement is not quite as good as for the centrifugal case.

In conclusion, it should be noted that the method of calculation adopted is largely based on that given by Pfleiderer in his standard text book on Fans in 1927. The author has, however, simplified the more general problem dealt with by Pfleiderer and reduced the method of calculation to a form which will appeal to the practical designer.

Pressure Distribution in Non-Uniform Two-Dimensional Flow. (M. Schwabe, Ing.-Archiv., Vol. 6, No. 1, Feb., 1935.) (T.M. 1,039, R.T.P. Translation No. 250.) (109/7 Germany.)

In an attempt to follow the time rate of change of the processes in turbulent flows by quantitative measurements the measurement of the pressure is often beset with insuperable difficulties for the reason that the speeds, and hence the pressures to be measured, are often very small. On the other hand, the measurement of very small pressures requires, at least, considerable time, so that the follow-up of periodically varying processes is practically impossible.

In order to obviate these difficulties a method, suggested by Prof. Prandtl, has been developed by which the pressure distribution is simply determined from the photographic flow picture. The two-dimensional flow past a circular cylinder is made visible on the surface of water by scattered particles and recorded under long exposure by a moving picture camera. The velocity of flow is deduced from the path lengths of the particles, the radius of curvature of the paths is defined, the pressure along a streamline is determined according to Bernoulli's general formula ($p = p_o - \frac{1}{2}\rho w^2 - \rho \partial\Phi/\partial t$), and transverse to the streamlines according to the centrifugal force formula ($p = p_o + \rho \int v^2/r ds'$). The pressure distribution formulas for different stages of development of the vortex pair and for one state of the vortex street is indicated, the pressure field determined, the pressure drop behind the cylinder analysed and the variation of the pressure drag coefficient with respect to time demonstrated. It reaches a value about twice as high as in the steady state. The asymmetrical pressure distribution on the cylinder is demonstrated for one stage of development of the vortex street and the force traverse to the flow direction defined; it amounts to more than 40 per cent. of the drag in this instance.

In the theoretical treatment the customary potential flow is superposed by a source-sink flow, the potential of which is secured by series development, from which the velocity components are deduced. In the pressure formula $p_o = \frac{1}{2}\rho w^2 + p + \rho \partial\Phi/\partial t$ the time variable $f(t)/a$ and its derivation are solved from the recorded motion of the free stagnation point.

A comparison of theory and experiment indicates good agreement in the streamline pattern. The approximation of the theoretical to the experimental pressure distribution on the zero streamline for an early stage of development of the vortex pair is also satisfactory.

Aileron Effectiveness at High Flying Speeds. (W. Wirz, Flugwehr und Technik, Vol. 4, No. 5 and 6, 1942, pp. 117-124 and 146-155.) (109/8 Switzerland.)

Aileron effectiveness can be defined in a variety of ways of which the simplest is the final angular velocity of steady roll associated with a given aileron deflection. Of greater practical importance is the angular acceleration and subsequent response immediately following on a sudden deflection of the aileron by a given amount as arises for example when the pilot initiates a sudden turn.

The author shows that the general problem can be simplified by the introduction of two moment coefficients derived as follows:—

M_Q = rolling moment at unit dynamic pressure and 1° deflection of the aileron due to change in lift distribution.

M_R = *ditto* due to a linear wing twist along the span and reaching unit value at the tip. (This twist may be either elastic or aerodynamic.)

Both these coefficients are constant for a given wing-aileron combination and their values have been calculated by the author for a range of designs from the change in lift distribution, the Pearson tables (N.A.C.A. Rept. No. 585) being extended for this purpose by making use of the method described by Multhopp (L.F.F., Vol. 15, 1938). For a normal fighter aircraft $M_Q/M_R \sim 5 \times 10^{-3}$.

Taking the simplest case of steady roll, the angular velocity of rotation finally set up must be such that the moment due to reduction of incidence brought about by rotation and wing twist balances the aileron control moment.

Putting

q = dynamic head.

ω = steady angular velocity.

r = forward speed.

b = span.

ϕ_E = aerodynamic or elastic wing twist at the tip (produced by roll or aerodynamic moment, *i.e.*, shift of c.p.).

β = aileron deflection,

we have

$$q\beta M_Q = qM_R\,(b\omega/2v + \phi_E) \qquad (1)$$

it being assumed that the actual moments vary directly as $q\beta$ and $q\phi_E$ respectively.

Now

$$\phi_E = q\beta\phi$$

where ϕ = flexibility of wing under aileron action.

We then obtain finally

$$\omega = (2v\beta/b)\,[M_Q/M_R - q\phi] \qquad (2)$$

This at once gives the critical dynamic head (zero angular velocity) as

$$q_{crit} = (M_Q/M_R) \times (1/\phi)$$

Beyond this speed we have reversal of aileron effect, the elastic deformation $q\phi$ becoming the controlling factor.

Compressibility effects can be allowed for by putting

$$q = \tfrac{1}{2}\rho v^2\,[1 + \tfrac{1}{2}M^2]$$

where M = Mach number.

This so-called Prandtl rule applies only up to $M = .6$. Over this region $M = .6 - .7$ some experimental data for the compressibility effect are available.

Beyond this limit the lift decreases very rapidly. It should be emphasised however that such data only apply to smooth wing contours and that an earlier collapse of this lift has to be reckoned with when ailerons are fitted (compression shock at slot).

Using the above equations, the author has calculated the velocity of steady roll for a standard fighter wing at various forward speeds for a 10° deflection of the aileron.

If the wing were completely rigid, ω would increase directly as v, varying from .4 to 1.8 radius/sec. as v increases from 50 to 225 m./sec. In practice, due to flexibility of the wing, ω reaches a maximum value of only .7 radian per sec. at 125 m./sec. After this, it rapidly diminishes and becomes negative at 225 m./sec. (−.055 radians/sec.), the critical q value being reached at about 220 m./sec.

Neglecting compressibility effects, the critical speed would be reached at 250 m./sec. The above equations can obviously also be utilised to calculate the aileron deflection to obtain a certain rolling speed. Practical considerations (breakaway of the flow and magnitude of control force required) limit these deflections to about ±20° at 100 m./sec. and ±10° at 225 m./sec. (≃ 800 km./h. or 500 m.p.h.).

The author has also calculated the variation in angular velocity of roll during a nose dive from rest at an altitude of 6,000 m. With rigid wings, an angular velocity of about 1.75 radian per sec. would be reached at 2,000 m. With a wing of standard flexibility, however, aileron reversal would take place at just about this altitude ($\omega=0$). Reducing wing flexibility to half would reproduce the original rate of turn, but in the opposite direction, reversal having taken place already at about 4,000 m.

Whilst the actual position of the elastic in relation to the aerodynamic axis has but little effect on these results (the wing twist due to lift distribution being relatively small in the steady state), matters are very different if we investigate the accelerated motion following sudden aileron operation. In this case, due to the relatively large lift loading, a rearward displacement of the elastic axis from the original 30 per cent to 45° chord position will raise q_{crit} by nearly 100 per cent. for the same wing flexibility (aerodynamic axis at 24 per cent. chord). If the elastic axis could be displaced to 69 per cent. of the chord, the wing would act as an apparently rigid structure under these conditions ($q_{crit} \rightarrow \infty$). This is however not considered practicable from the point of view of weight.

In the examples considered above, the elasticity of the wing reduced the effectiveness of the aileron, *i.e.*, the rearward travel of the c.p. accompanying the aileron deflection twists the wing so as to reduce the increase in lift normally associated with aileron operation. It is obvious that if the elastic deflection could be made to assist the required rolling moment, a very considerable decrease in the value of β for a given ω would result. Thus at 200 m./sec. the normal fighter previously considered will require $\beta \sim 10°$ for an angular velocity of .225 radians/sec. This is reduced to about half if the sign of ϕ_E in equation (1) above could be reversed.

Schemes for rendering this possible are discussed by the author. It is interesting to note that Messerschmitt has taken out a patent for producing the rolling moment by ejection of air over certain regions of the wing. By continuing suction and ejection in a suitable manner, it is possible to produce a wing twist in the required direction.

As an alternative, leading edge flaps are discussed. These, however, will have a deleterious effect on the boundary layer of the main wing and thus lead to considerable increase in drag.

In conclusion, the author points out the extreme importance of using thin wing sections for high speed flight so as to delay the occurrence of the shock wave.

In order to obtain sufficient stiffness, it may be necessary to adapt a braced wing construction.

The Determination of Fuselage Moments. (C. E. Pappas, S.A.E. Preprint War Engineering Prod. Meeting, Jan. 11-15, 1943.) (109/9 U.S.A.)

The purpose of this paper is to present theoretical coefficients of additional apparent mass for an ellipsoid of three unequal axes and to indicate the change in the theoretical coefficients when boundary layer, interference and turbulence effects are considered. In order to determine the effect of a viscous, incompressible fluid on the additional apparent mass coefficients, wind tunnel tests on circular fuselages alone and in combination with a wing were used to determine the extent of the variation in the theoretical coefficients.

Pitching and yawing moments can be readily determined for circular fuselages alone and in addition the change in fuselage moments resulting from the interference effects of a wing can be found from the figures presented in the main body of the paper.

An attempt has been made to give the necessary theory associated with the concept of additional apparent mass so that the reader may understand better the actual variation of moment of a body moving in a viscous fluid in terms of the mass coefficients.

Elimination of Unnecessary Weight in Aircraft. (M. Boe, Aero Digest, Vol. 41, No. 6, Dec., 1942, pp. 154-158.) (109/10 U.S.A.)

At the moment weight control is practised to an effective degree on only that part of the aircraft which is designed and built by the aircraft manufacturer. That means that only about 40 per cent of the gross weight (i.e. the airframe proper) is really efficient, this result being achieved at considerable trouble and expense by the weight control group. Extensive re-designs are often found necessary and advisable rather than accept the penalty imposed by unnecessary weight. The remainder of the gross weight is made up of approximately 20 per cent disposable load and 40 per cent equipment.

The author points out that with rare exceptions, weight consciousness has not yet percolated through to those responsible for equipment design and that considerable improvements should be possible in this group which in total weight approximates to that of the aircraft structure itself. In this connection it is pointed out that examination of the equipment of the German Me 110 has revealed that German instruments and small accessories are approximately 10-15 per cent lighter, armament equipment up to 50 per cent lighter, and the engines 9.5 per cent lighter (on the basis of pounds per take-off horse-power) than the equivalent standard American equipment. It is interesting to note that every lb. of equipment requires on the average ½ lb. of supporting structure, so that a saving in equipment weight is doubly beneficial. Even if, however, the old structure is retained, an 8 per cent. reduction in equipment weight of a 7,250 lb. fighter (gross) will enable it to carry an additional 230 lb. of load.

This saving could be used either:—

(1) To increase range by 25 per cent.
(2) To increase fire power by 750 rounds.
(3) Addition of 17 sq. ft. of armour protection.

Alternatively, the addition load rendered available could be utilised in fitting a more powerful engine and thus increase the performance at the expense of the range.

Under normal conditions, a 10 per cent increase in the power output of a standard fighter entails an increase of about 3.5 per cent of the gross weight of the aircraft, with the result that the increase in performance is relatively slight. This is shown in the following table:—

	Original	+10 per cent. power (same weight)	+3.5 per cent. weight	New performance
Speed	350	+12	−2	360
Rate of climb (ft./min.) ...	2,480	+500	−310	2,670
Ceiling (ft.)	31,600	+5,060	−3,210	33,450
Range (M)	1,000	—	−15	985
Landing speed (m.p.h.) ...	80	—	+1.5	81.5
Take-off distance (ft.) over 50 ft. obstacle ...	1,800	−200	+140	1,740

It will be noted that the increase in weight is specially detrimental in wiping out a large proportion of the increase in rate of climb and ceiling to be expected from the power increase.

If, therefore, the gross weight of the aircraft could be decreased by only 3.5 per cent by careful design of equipment or airframe, the rate of climb could be increased by another 300 feet/min., and the ceiling raised by over 3,000 feet.

Whilst it has been customary up to now to increase performance by fitting ever bigger and heavier engines, the alternative of weight reduction seems to have been lost sight of somehow.

The Mitsubishi OO fighter is an interesting example of what can be done with relatively small power plants if the weight of the aircraft is sufficiently reduced.

Flight Research and Routine Testing at Various German Aircraft Works. (C. Cornelius and others, Luftwelt, Vol. 10, No. 3, 15/1/43, pp. 22-23.) (109/12 Germany.)

The article covers notes ranging from flight research proper to works acceptance tests after which the aircraft is passed to the front.

The Junkers firm appears to have specialised in research, their flight research section having been in existence now for nearly 20 years. Special aircraft were built to test such items as transmission shafts for propeller drives and single wheel landing gears (in this case two lateral skids are fitted below the wing).

The standard transport Ju. 52 has also been modified to act as a flying laboratory for power plant investigations and has even been fitted with an additional wing and water spray for icing experiments.

It is interesting to note that investigations on dive bombing were carried out as long ago as 1928, using a Junkers K47 aircraft fitted with a very makeshift bomb release gear below the wing. A year earlier a pressure cabin aircraft was successfully flown at an altitude of 13,000 m.

The article gives some details of the acceptance tests on the Ju. 88 dive bomber. As is to be expected in an aircraft of this type, hardly any two samples leaving the assembly track behave alike during the first dive, and careful retrimming is generally required. The proper functioning of the diving brakes and automatic pull-out device has to be assured, and instrument readings supervised. It speaks highly for the skill of the chief test pilot of the works to have carried out over 2,000 dives without a single accident.

The development work carried out by the Messerschmitt firm on the Me 109 fighter seems to have been very lengthy. It is emphasised that the Luftwaffe fighter pilot does not generally receive as long or thorough a training as is given to the bomber pilot, and it is therefore necessary to make the fighter aircraft as simple to handle as possible. An adequate factor of safety must be retained even if mistakes of control are made such as are likely to arise in aerial combat. In earlier models several cases of wing fracture and severe tail flutter arose which have now been cured. The tail surface itself has been modified many times before adequate control was assured. It is stated that this machine now recovers automatically from a stall. The utmost attention was paid to securing the highest possible speed, and dozens of flight tests were carried out on the shape of the cockpit alone so as to combine minimum drag with best vision for the pilot.

Some interesting notes on routine testing the Do. 215 and a maximum speed test on the He. 111 conclude the article.

The state now seems to have been reached where the human element rather than the machine is determining the performance limit. Reference is made to a fatal accident brought about by sudden altitude collapse of the pilot at an altitude of 9,000 m., although the oxygen plant was functioning properly. It appears that the attack was accompanied by cramp in the legs, with the result that the pilot put the aircraft into a steep spiral dive. The aircraft disintegrated but the observer managed to escape by parachute.

Escher-Wyss Variable Pitch Airscrew Adapted for Braking Landing Run. (Inter. Avia., No. 848-849, 21/12/42, pp. 11-12.) (109/13 Switzerland.)

The well known Escher-Wyss variable pitch propeller has now been modified to allow braking during the landing run. With the employment of a rate of pitch change of about 8 deg./sec. and the extension of the speed control range from 100 per cent to 40 per cent. of the normal speed, it was possible to relieve the pilot entirely from the supervision of the airscrew even in flying manœuvres which place the greatest demands on the pitch control, for example, the sudden initiation of a dive at any engine output. For the tactical employment of aircraft types at present in use as well as for the increase in the speed of future types, the landing brake has opened up new possibilities. According to official measurements, the following results have been obtained with a single-engined fighter equipped with the Escher-Wyss airscrew: with the wheel brakes alone, the landing run amounted to 61 per cent., with the airscrew brake alone to 28 per cent., and with the simultaneous operation of wheel and airscrew brakes to 17 per cent. of the normal landing run without brake at all. The braking of the landing run with the aid of the airscrew became possible only after the designers had succeeded in increasing the speed of the airscrew pitch to such an extent as definitely to eliminate the engine racing hazard. The Escher-Wyss airscrew, which is now in quantity production, has a pitch angle change rate of more than 20 deg./sec. for changing the blades from the normal to the braking position and vice-versa. Since, as is natural, the greatest importance has to be attached to maximum operational safety of the installation, a combined panel has been adopted to simplify the operation of the airscrew; in order to avoid all errors in operation, the panel contains a single lever. By actuating this single lever the following functions can be carried out: Control of the engine output and selection of the airscrew speed constantly to be maintained; application of the short-period emergency output; reversing the airscrew blades to the braking position; control of the engine with the blades in the negative position and the latter's reverse to the normal position. The weight of the entire additional installation required for the braking of the landing run amounts to about 26½ lb. The practical design of a safe controllable pitch airscrew capable of being used for braking the landing run is bound to meet with interest everywhere where modern, highly loaded aeroplanes featuring high landing speeds must be operated from airfields of limited dimensions. In particular, this type of brake might make it possible to equip aircraft carriers with modern aeroplanes of high landing speeds. On the other hand, the normal landing speed can be increased considerably beyond the limit possible to-day; which in turn would allow a corresponding increase to be made in the maximum speed of the aircraft without entailing the disadvantage of excessively long landing runs. The experiences gathered so far are limited to the braking of single-engined tractor aeroplanes with conventional landing gears: the employment of the airscrew brake in twin-engined aeroplanes or types equipped with tricycle landing gears is unlikely to meet with insuperable difficulties.

Bearings and Bearing Corrosion. (L. Raymond, J.S.A.E., Vol. 50, No. 12, Dec., 1942, pp. 533-537.) (109/14 U.S.A.)

" Babbitt " bearings have been accepted generally as the preferred bearing metal for by far the great majority of bearing applications due to their low friction

characteristics, conformability, embeddability, bonding characteristics, and corrosion resistance. However, under conditions of increased bearing loads and higher oil temperatures, babbitt bearings of conventional design are susceptible to fatigue failure, resulting in breaking out of the bearing metal. In such cases, protection has been sought in bearing metals with improved high-temperature strength characteristics, the bearing alloys resorted to being copper-lead, cadmium-silver, cadmium-nickel, and hardened high lead (98 per cent. lead), as well as other high-lead alloys. The most widely used of these newer types of precision bearings has been the copper-lead. A typical approximate analysis of this bearing metal is 65 per cent. copper, 35 per cent. lead.

Unfortunately such bearings, unlike babbitts are corroded by the products of oil oxidation, the lead being dissolved and the remaining copper shell breaking away from the backing.

Data presented in this paper indicate the bearing corrosion problem to be fairly straightforward in that:—

1. Corrosion of copper-lead bearings specifically can be reduced by improving the fineness of the microstructure;

2. All bearings appear to be aided greatly by reduction of operating temperatures; and

3. Treating the corrodible bearings by special processes, such as indium plating, greatly increases their corrosion resistance.

However, anomalies are cited which indicate that bearing and oil combinations do not behave in relatively the same manner in all engines.

Different types of corrosion may occur in different engines or bearings, or a mechanical or assembly defect, rather than a corrosive oil, may be responsible for bearing failure. The appearance of a bearing frequently fails to indicate the reason for its failure, and more thorough investigation must be made.

In his conclusion the author emphasizes that the field of bearing corrosion still has large unexplored areas.

Aircraft Engine Radio Shielding. (D. W. Randolph, J.S.A.E., Vol. 50, No. 12, Dec., 1942, pp. 538-541.) (109/15 U.S.A.)

Spark ignition engines require a heavy and troublesome ignition harness for eliminating disturbances in the radio systems for communication and navigation used on the aeroplane. The disturbance produced by the high-voltage electrical system is distributed over a wide range of frequency and covers all the frequencies used in radio both of the ultra-high and moderately-high frequency ranges. The interference in moderately-high wave lengths may arise from voltage regulators, generators, and other electrical apparatus, as well as in the ignition system alone. In the short and ultra-short wave regions the ignition system is the worst offender. The disturbances that arise are very severe in the high-frequency ranges and will completely prevent radio communication unless they are eliminated. The use of damping resistors in the high-voltage circuits is only a partial solution to the problem and is of little value with high-sensitivity sets. To confine the field caused by the oscillations in the ignition circuit, all of the high-tension wiring, and the low-tension wiring associated with it is enclosed in a continuous metal shield which makes good contact with the engine. How to secure a structure that will shield the high-tension circuits while providing good insulation under severe conditions of vibration, temperature, altitude, and exposure, is the problem.

As regards shielding, the resistance across a joint or at a grounding point must not exceed .002 ohm. This will require specially machined bearing surfaces of adequate area. Anodized surface and non-metallic gaskets must be eliminated. Moreover the grounding point must be closely spaced (9 to 18 inches apart).

The next difficulty is to supply adequate electrical insulation inside the shield the insulator being exposed to the combined effect of moisture, corona discharge and acid decomposition products of the air. One method of overcoming the difficulty is to ventilate the harness with dry air. This, although successful on

civil aircraft, is too cumbersome on military machines. In their case, air and moisture are excluded by embedding the individual conductors in a special compound which completely fills the harness. A small opening is provided near the spark plug to enable any gas leaking past the electrodes to escape into the air. Methods of testing insulation resistance of the harness are described and the beneficial effects of fitting a damping resistance at the spark plug are discussed (reduction of electrode erosion).

An interesting recent development consists in a low voltage current distribution to individual spark coils in or near the spark plugs. This obviates the considerable lengths of high voltage cables in the standard equipment and facilitates shielding.

Methods of Stress Determination in Engine Parts. (C. Lipson, S.A.E. Preprint, War Engineering Production Meeting, Jan. 11-15, 1943.) (109/16 U.S.A.)

Development of experimental stress analysis has now reached the point where it has become a practical tool in the hands of an engineer or a designer. Four methods are available and in the utilization of these methods there are two principal means of procedure: static tests, using simulated service loading, and dynamic tests, under actual service conditions.

Static load testing is usually the most convenient and generally favoured because the problem of instrumentation is greatly simplified. The penalty for this simplification lies in the fact that the investigation is often conducted on the basis of loads which may or may not correspond to operating conditions. Dynamic loads testing demands more complex instrumentation and so far it is less thoroughly developed. A comprehensive stress analysis investigation requires both phases of testing: dynamic tests should establish the mode and magnitude of operating loads while static measurements will determine the corresponding stresses. Refinements of instrumentation and technique are necessary to promote greater accuracy and speed but this particular phase of experimental stress analysis is developing in a satisfactory manner.

Essential information is still lacking for the following problems:—

1. The influence of size when translating fatigue data from small specimens to larger parts.
2. Evaluation of the effect of combined stresses in terms of the fatigue data derived from rotating beam testing.
3. The influence of preload and operating stress range on the endurance life.
4. The effect of stress-raisers on the mechanical properties of materials.
5. The effect of manufacturing processes on the endurance life.
6. The mechanical properties at elevated temperatures.

The author attempts to show that stress analysis, even in its as yet partially developed stage, can provide essential information involving strength of materials.

The Influence of Lubricating Oil Viscosity on Cylinder Wear. (H. A. Everett. S.A.E. Preprint, War Engineering Prod. Meeting, Jan. 11-15, 1943.) (109/17 U.S.A.)

Wear of piston rings and cylinder walls is the greatest single item of wear in the modern automotive internal combustion engine. While under normal service conditions such mechanical wear is slight, the process is continuous and is materially influenced by such factors as (a) operative conditions, (b) characteristics of fuels and lubricants, and (c) the composition and surface condition of the parts themselves. It has been shown that different lubricating oils have a marked influence on cylinder and ring wear, even though scuffing or seizure does not develop, and these tests were undertaken with the purpose of determining the influence on wear of one single property of the lubricating oil, its viscosity.

Special precautions were taken to eliminate all other variables and the range of viscosities covered was as extensive as compatible with this restriction. Tests

were made with six oils ranging from a viscosity lighter than SAE 10 to a viscosity greater than SAE 70.

Each oil was tested in a battery of six single-cylinder engines operating under conditions artificially controlled to closely simulate moderately heavy duty road operation of automobile passenger car engines.

From one result it appears that the cylinder and ring wear in well-lubricated engines decreases progressively with increasing viscosity throughout the range tested, the wear being almost inversely proportional to the kinematic viscosity. This is in harmony with our current understanding of fluid film lubrication as the film thickness for a given loading is probably nearly proportional to the kinematic viscosity and certainly wear is an inverse function of the film thickness. An accurate determination of the character of the lubrication, i.e. whether of fluid film or boundary type, cannot be made but the small amount of wear, the smooth surfaces, and the light loading due to ring pressures indicate that through the majority of the reciprocating cycle fluid film action was predominant.

New Methods for the Evaluation and Recording of Piston Skirt Deposits. (H. R. Luck and others, S.A.E. Preprint No. 7, National Fuels and Lubricants Meeting, Oct. 22-23, 1942.) (109/18 U.S.A.)

Although a lubricating oil or additive may originate in the chemical laboratory and be subjected to many physical and chemical laboratory tests, the final proof of its suitability comes as a result of engine tests under conditions simulating those that the oil must meet in service. These tests, to be of value, must be carefully controlled and the result accurately evaluated and recorded in a form that is reproducible.

This task is especially difficult when piston skirt deposits are to be considered. The bare statement that piston *A* has more deposits than piston *B* is not sufficient. Quantitative results must be available: first, when a given engine test is developed, so as to determine the degree of reproducibility attained by the test, and second, when comparisons are to be made between different lubricants. Added advantages of quantitative measurements are that they make possible comparisons between separate laboratories and facilitate the standardization of test procedures.

Specifications for such measurements should include:—

1. Numerical evaluation of piston skirt deposits that could be reproduced by different observers even though not skilled in the procedure used.

2. A method of evaluation that uses commercially available equipment in order that any laboratory could adopt the procedure with minimum of trouble.

3. An objective system of measurement, so that the method will not be subject to major revision by each individual observer.

In addition to the problem of measuring the deposit on the piston, there is the problem of photographing the form, location and intensity of these deposits in order to keep a record available without the need of preservation of all used pistons. Photography of a cylindrical object is not easy, if all direct light reflection from the surface is to be avoided and photography of a piston surface to show the entire circumference on one print with uniform lighting that accents the carbon deposits and without distortion of portions of that surface is desirable.

It is the purpose of this paper to describe two devices now in use in the authors' laboratory that greatly assist in the solution of these problems.

Damping Characteristics of Some Mg. and Al. Alloys Over the Range of −50° to 280°C. (L. R. Stanton and F. C. Thompson, J. Inst. Metals, Vol. 10, No. 1, Jan., 1943, pp. 29-42.) (109/19 U.S.A.)

The damping capacities (P) of some magnesium alloys have been measured at temperatures varying from about 50° to 280°C., and, for comparison, the damping capacities of two typical aluminium alloys have also been determined. The con-

clusions are: (1) In general the magnesium alloys have a distinctly higher value of P than have the aluminium-base alloys, and, for equal fibre stresses, both materials have much greater damping capacities than has steel. (2) Both sets of alloys show a minimum in their damping characteristics at a temperature just below the normal room temperature, the damping increasing as the temperature is either raised or decreased. With the exception of the magnesium alloy Elektron AZ855, the properties of which are abnormal in this respect, the damping capacity of the alloys decreases as the fibre stress is reduced.

Magnetic Method for Testing the State of Heat Treatment for Fabricated Products. (H. Lange, Kaiser Wilhelm Inst. fur Eisenf., Vol. 21, 1939, No. 6, pp. 105-113.) (109/23 Germany.)

Non-destructive testing by magnetic methods can be of two types. The first deals with the determination of flaws by irregularities in the stray magnetic field, making use either of a magnetic powder applied to the surface or by direct measurement of the field strength in the immediate neighbourhood of the specimen.

The second type of testing attempts to obtain data on constitution, strength or hardness of the specimen by purely magnetic means. It may thus serve for routine testing as to nature of material and effectiveness of heat treatment. Whilst the magnetic method of flaw detection has been developed very considerably of late and is extensively used in industry, the correlation of mechanical strength with magnetic qualities is still very much in the experimental stage. The author has carried out investigations on this subject making use of the Siemens Ferrometer (see Z. Techn. Physik, Vol. 15 (1934), pp. 469/473). This instrument enables the determination of the differences in magnetic inductions of two samples at the same field strength as a function of the latter. For this purpose the two samples (standard and test) are magnetised by identical coils placed in series and supplied with alternating current. Secondary coils are arranged in opposition and the voltage generated is a measure of the difference in magnetic induction between the two specimens. The ferrometer enables a record of this difference to be traced by a special oscillograph on a field strength basis. It was hoped that the resultant curves would be sufficiently characteristic to differentiate between steel specimens of different constitution and heat treatment. For this purpose four characteristic steels of gradually increasing carbon content (.09 to .45 per cent.) were chosen and subjected to different heat treatments. The author concluded that the Siemens Ferrometer is not suited for determination of constitution (so-called magnetic analysis) since it cannot differentiate between purely constitutional effects and those due to heat treatment. It appears that such constitutional analyses are better carried out by constant current methods working in the saturation range (see same journal, Vol. 20, 1938, pp. 239/246). If, however, the tests are confined to steels of similar constitution but subjected to different heat treatment, a satisfactory correlation between Rockwell hardness of the tempered specimens and ferrometer readings were obtained, provided the maximum field strength was kept sufficiently low (hysteresis loop deteriorates into the so-called Rayleigh loop consisting of two intersecting parabolas).

Under these conditions, the results show that either the remanent or the maximum induction are a measure of the hardness of the specimen. It is therefore not necessary to trace out the complete loop for this correlation and the author describes a simple circuit in which a simple soft iron amperemeter and a thermo millivoltmeter replaces the ferrometer oscillograph.

The two samples undergoing comparison are provided with primary and secondary windings, of which the primary is fed with alternating current as before. Since the mean value of the secondary voltage is a direct measure of the maximum induction, and since distribution can be kept small by working with low excitation, the deflection of the thermo millivoltmeter will give directly the difference in maximum induction of the two specimens for the field strength corresponding to the soft iron amperemeter reading.

The apparatus is easy to use and results show that it can satisfactorily sort out bolts of the same material but different hardness. Similarly it is possible to follow the tempering process magnetically.

A New Double Joke Electromagnet for the Testing of Magnet Steels. (F. Stablein and R. Steinitz, Tech. Mitteil. Krupp, Vol. 3, 1935, pp. 129-135.) (109/24 Germany.)

After a review of available methods for testing the magnetic qualities of nickel aluminium steels of high coercivity and a discussion of their defects, the author describes a novel magnet tester specially suited for routine testing. Such a control is necessary since these magnets are supplied in the cast state and are very sensitive in their magnetic qualities to the rate of cooling in the mould. Investigations carried out on specially cast samples of different dimensions to the ultimate product are thus apt to give misleading results and control tests on the actual magnets are necessary.

The apparatus devised by the author consists of a double joke electromagnet, each half resembling the letter E. This is wound with four coils in series under exact conditions of symmetry with the result that in the absence of magnetic materials in the air gaps, the field strength is zero in the central gap. If, however, one of the outer gaps is bridged with a magnetic sample, the field strength in the central gap is proportional to the magnetisation (B-H) of the sample.

This magnetisation is recorded directly by the deflection of a moving coil placed in the central gap and carrying a small current. The magnitude of this current is so chosen that the deflection of the coil is directly proportional to the induction. The value required depends on the length and cross-section of the test specimen as well as on the dimensions of the electromagnet and can be obtained from a series of calibration curves utilising known materials. The field strength H producing the magnetisation of the sample is measured directly from the voltage generated by a small rotating coil placed in close proximity to the sample.

Results obtained with this instrument are in good agreement with those obtained by the more complicated and lengthy ballistic methods. Routine testing as regards remanence and coercivity of the sample can be carried out quickly over the range $\pm$8,000 gauss and $\pm$2,000 oersted respectively. As pointed out by the author the instrument could be easily modified to record the B-H/H curve automatically on an oscillograph by providing a second rotating coil in the central air gap.

New Apparatus for the Non-Destructive Testing of Materials. (Schweizerische Technische Zeitschrift, 1942, p. 562.) (109/25 Germany.)

In the X-ray examination of materials it has been usual to make use of a fluorescent screen. As an alternative, the ionisation of the air after passage of the X or γ rays through the specimen can be measured directly by means of a Geiger counter. The latter consists essentially of a condenser contained in a lead tube filled with air at a reduced pressure (.1 atmos.) and connected to a potential difference just below the normal breakdown value.

A slight initial ionisation of the air in the tube brought about by entry of radiation through a light metal window is rapidly increased by collision and a considerable charge is transmitted to the central electrode which is connected to a string electrometer. After every deflection of this instrument, the condenser can discharge through a high resistance shunt and the number of deflections per second is thus a measure of the degree of ionisation to which the counter is exposed.

This ionisation will in turn depend on the weakening effect of the interposed specimen (nature of material and size). By calibrating the instrument with a standard specimen, departure due to internal faults can be found and in this manner cavities in steel at a distance of 30 cm. from the surface have been detected. The instrument is also very useful in examining steel blanks for gear wheels and

a special counter (14 mm. diameter) can be inserted inside tubes for rapid testing of consistency of wall structures. It should be noted that the instrument does not only show up flaws but also any differences in wall thickness due to corrosion, etc. This is especially useful in the case of tank or boiler installations. Other interesting applications of the counter are in connection with liquid level gauges (weakening effect of liquid on radiation) and automatic control of the powder core of match fuses. In this case the fuse is made to travel past the instrument at a constant rate (~80 cm./sec.). Any break of the order of 5 mm. in the core is at once recorded and the motion automatically stopped. The fault is then examined visually on the X-ray screen.

On the Elastic Distortion of a Cylindrical Hole by a Localised Hydrostatic Pressure. (H. M. Westergaard, Kármán Anniversary Volume, 1941, pp. 154-161.) (109/26 U.S.A.)

A hydrostatic pressure applied only within a small part of the length of a cylindrical hole extending through a large elastic solid will create a greatest radial displacement and a greatest circumferential tension that are smaller than if the pressure were applied over the entire length of the hole. The difference may be significant when high pressures are contemplated. The analysis presented is approximate. A first approximation and an improved second approximation give numerical results that are quite close together. This will appear from the following table.

Values of the ratio of the greatest displacement P_o, produced by a hydrostatic pressure in the space $Z^2 < C^2$, to the displacement P_m, produced by the same pressure applied over the entire length of the hole C, 'a' being the radius of the hole.

C/A	P_o/P_m by the first approximation	P_o/P_m by the second approximation
0.25	0.557	0.537
0.50	0.806	0.770

This close agreement and considerations of the singularities at the ends of the space under pressure are evidence that the procedure is adequate for some practical applications.

On the Minimum Buckling Load for Spherical Shells. (K. I. Friedrichs, Kármán Anniversary Volume of Applied Mechanics, 1941, pp. 258-272.) (109/27 U.S.A.)

Von Kármán and Tsien have recently introduced a basic new notion into the theory of elasticity; the "minimum buckling load." If a spherical shell of constant thickness is subjected to a uniformly distributed normal load p, a uniform contraction will result. This contracted state will be stable until a critical value of p, the "Euler" load p_E is reached. Experiments, however, show that the shell will already buckle out when the load p is only a fraction of the Euler load p_E. Von Kármán and Tsien have explained this phenomenon. They have discovered that for values of p considerably below p_E quite different stable states of equilibrium exist, which could be revealed only by abandoning the classical linearisation of the problem. The minimum of such values of p is the "minimum buckling load," p_K; if p exceeds p_K the chances are great that buckling will occur.

In determining the minimum buckling load von Kármán and Tsien make various simplifying assumptions which have a rather strong influence, as will be shown. The aim of the author is to investigate the influence of such assumptions and, after removing some of them, to propose a somewhat different procedure for obtaining the buckling load.

A first assumption of von Kármán and Tsien is that the shape of the buckled shell differs noticeably from a sphere only in the neighbourhood of one point.

They then introduce a simplification by assuming that the shell buckles only inside a certain segment, at the edge of which it is clamped. In this paper, the first assumption is formulated in a different manner, it is considered to refer to a boundary layer phenomenon, and this is made the basis of an asymptotic treatment. Thus the advantage is gained that it is no longer necessary to restrict buckling artificially to only a segment of the shell, and that the difficulty of the reaction moment at the edge of such a segment disappears. Von Kármán and Tsien's assumption that the deflection is rotationally symmetric is here retained by the author. The further assumption, however, that the deflection is vertical, *i.e.*, parallel to the axis of symmetry is dropped. The author shows that this assumption has an exceedingly strong effect. For the linearised problem its effect is to double the Euler load; for the non-linear problem it invalidates our asymptotic procedure and even changes the order of magnitude of the minimum buckling load. The assumption that Poisson's ratio ν vanishes is not made. For the numerical approximation a Ritz method involving two parameters is employed; the results deviate considerably from those of von Kármán and Tsien. It appears that approximation by the Ritz method is rather uncertain when applied to these problems. No definite value for the minimum buckling load has yet resulted. It is felt, however, that the results in their present stage may nevertheless be of interest.

Experimental Determination of the Isostatic Lines. (A. J. Durelli, J. App. Mech., Vol. 9, No. 4, Dec., 1942, pp. 155-160.) (109/28 U.S.A.)

In this paper a direct method for obtaining the isostatics or stress trajectories is described. These lines indicate the directions of the principal stresses. The procedure used by the author can be applied almost without regard to the geometrical form of the object under stress. It also possesses the advantage in that the test is non-destructive and that in most cases it will yield values of the stress magnitudes within 10 or 15 per cent. of the correct values. The technique consists in covering the surface of the body with a thin coat of lacquer which becomes brittle upon hardening. If the object being tested is painted under zero load and then stressed after the coating has hardened, the layer of lacquer will crack along lines perpendicular to the maximum tensile strain. The companion set of trajectories at right angles can usually be formed through relaxation. As an aid in photo-elasticity this procedure has great possibilities as it eliminates the necessity for determining the isoclinic lines which are difficult to obtain.

The Photoelastic Analysis of Transverse Bending of Plates in the Standard Transmission Polariscope. (D. C. Drucker, J. App. Mech., Vol. 9, No. 4, Dec., 1942, pp. 161-164.) (109/29 U.S.A.)

In this paper the ideas of three-dimensional photo-elasticity are applied to the analysis of plates under transverse bending, resulting in a simple photo-elastic method, employing the standard two-dimensional transmission polariscope. The procedure used is to " freeze " a fairly high initial tension in bakelite or similar material, cut out the model at some angle to the direction of the tension, bend, and observe. Results of various tests are given; photographs of two cases, the circular hole and the semi-circular notch, are included. Stress concentration factors are also obtained and analysed. The problem of the thick plate as contrasted with the thin plate, assumed in the usual theory, is discussed briefly.

The stress concentration factor of 2.4 obtained for the circular hole and semi-circular notch, in a plate under pure bending for a diameter equal to the thickness of the plate, is of practical interest. Further work is planned to obtain theoretical stress concentration factors between the 1.8 for the thin plate and 3 for the small hole.

Brittle Coatings for Quantitative Strain Measurements. (A. V. de Forest and others, J. App. Mech., Vol. 9, No. 4, Dec., 1942, pp. 184-188.) (109/30 U.S.A.)

The use of brittle coatings in stress analysis is discussed in this paper. Particular reference is made to the " stress-coat " materials and method which can effect quantitative analyses within the elastic range by use of brittle coatings alone. In the plastic range, the flaking off of the coating is shown to be caused by a compression component of strain of about 1 per cent. Graphs and illustrations show the effect of such variables as coat thickness, time of dry, temperature and humidity, creep and bubbles in the coating. Test procedure is outlined. Application of the method to a part from a high-speed sewing machine shows stress values and correlation of results with fatigue failures. Another application illustrated is a plate, penetrated by a bullet, showing elastic and plastic deformations during the impact loading.

Mechanics of Creep for Structural Analysis. (J. Am. Soc. Nav. Engs., Vol. 54, No. 4, Nov., 1942, pp. 578-594.) (109/31 U.S.A.)

In this paper a new creep-stress law is proposed for materials in which creep at both normal and elevated temperatures is important. Some experimental evidence is given and other data are cited that show the validity of the creep law assumed. A theory for stress and deflections in members subjected to bending is developed and the values compared with creep test results. Theories are then derived for the analysis of statically indeterminate structures in cases where creep is present. Comparison of results with the elastic case shows that there may be an appreciable difference in the values of reactions and moments. It should be noted that there is considerable need for experimental work on this problem. In the meantime, however, this paper shows, in general, how structural analysis is modified when creep occurs in engineering materials.

Stresses and Displacements in a Rotating Conical Shell. (J. L. Meriam, A.S.M.E. Preprint, Annual Meeting, Nov. 30th-Dec. 4th, 1942.) (109/32 U.S.A.)

The analysis of shells is an important sub-division of the general theory of elasticity, and its application is useful in the solution of engineering problems involving thin-walled structures. A common type of shell is one which possesses symmetry with respect to an axis of revolution. A theory for such shells has been developed by various investigators and applied to a few simple cases such as the cylindrical, spherical, and conical shapes. Boundary conditions, for the most part, have been simple static ones, and conditions of surface loading have been included in certain special cases. This paper extends the theory of axially symmetrical shells by including the body force of rotation about the axis and applies the results to the rotating conical shell. The analysis follows a pattern established by several investigators and for this reason is abbreviated to a considerable extent. Only where the inclusion of the body force makes elucidation advisable or where a slightly different method of approach is used are the steps presented in more detail.

Experimental Investigation of Tube Expanding. (E. D. Grimison, A.S.M.E. Preprints, Annual Meeting, Nov. 30th-Dec. 4th, 1942.) (109/33 U.S.A.)

This paper gives results of an experimental investigation to determine (a) the fundamentals involved in tube expanding; (b) the various practical methods of measuring the degree of expansion; (c) the optimum degree of expanding; and (d) the ultimate strengths of expanded joints under various conditions of service. Characteristic relationships of seat pressure on tube to degree of expanding are given, which clearly show the optimum degrees of expanding. An explanation

for the existence of the optimum is developed. Determinations of structural strengths of joints under instantaneous loading to failure are reported, as well as the results of repeated smaller loadings through 1,000 cycles. The joint was not injured by these repeated applications of loads. The investigation has derived information which has led to a more positive procedure for rolling-in tubes.

The Holding Power and Hydraulic Tightness of Expanded Tube Joints Analysis of the Stress and Deformation. (J. N. Goodier and G. J. Schoessow, A.S.M.E. Preprint, Annual Meeting, Nov. 30th-Dec. 4th, 1943.) (109/34 U.S.A.)

The expanding process used for making the tubes of boilers tight and in other applications is idealized to form a problem in the theory of plasticity. This problem is solved in order to find out how far the factors taken into account in this theory are adequate to explain the results obtained in tests. The pressure left between the tube and plate or seat, which gives it tightness and contributes to its strength, is the principal object of calculation. Its variations with the yield stresses of tube and plate material, with degree of expanding, and with the thickness of the plate, are obtained in graphical form. Numerical comparison with tests is made for six joint, with fair agreement in five, the theoretical values being within 12 per cent. All are on the low side, and this is to be expected from the fact that the theory disregards strain-hardening, stress in the direction of the tube axis, and possible differences between expanding by a three-roller tool and expanding by uniform pressure within the tube.

A Principle of Maximum Plastic Resistance. (M. A. Sadowsky, A.S.M.E. Preprint No. 11, Annual Meeting, Nov. 30th-Dec. 4th, 1942.) (109/35 U.S.A.)

Hitherto, a complete determination of stresses in a plastic body has been dependent upon a successful analysis of deformation in plastic flow, the method of computation being essentially based on Nadai's stress-strain relations. The principle of maximum plastic resistance, as introduced in this paper, establishes a new method of computation of stresses only, without any explicit reference to deformation. Formally, the principle is progressive, since it supplies equations sufficient for solution; intrinsically and physically, the principle treats the plastic body as a reacting medium automatically producing maximum values of resultant reaction. Combined plastic tension, torsion, and inner pressure (in a boiler) are chosen as cases in which to apply the principle. The results are condensed in the relative diagram accompanying the paper.

Volute-Spring Formulæ. (C. J. Holland, A.S.M.E. Preprint No. 12, Annual Meeting, Nov. 30th-Dec. 4th, 1942.) (109/36 U.S.A.)

Previous formulæ for determining stresses, loads, and deflections in volute springs are very few, such as there are being unwieldy and difficult to apply. To correct this situation, the author has developed simple formulæ for volute springs based on tensile stress, which include factors covering the proper consideration of bar curvature, pitch angle, and bending stress. By geometry he shows that a line, drawn through the mean diameters of the turns of a volute spring, is a parabola, but that the line differs very little from a straight line forming the side of a triangle; that using the triangle as a base for the derivation of his formulas does not introduce any appreciable error and does permit of extreme simplification. He also points out that volute-spring formulas should be based on diameters, because the turns of a volute spring are not circles and, therefore, using the radius will not give accurate results. The author carries through typical design calculations to show the application of the formulas, including the developed bar length and the weight of the finished spring.

The Influence of the Shape and Rigidity of an Elastic Inclusion on the Transverse Flexure of Thin Plates. (Martin Goland, A.S.M.E. Preprint No. 17, Annual Meeting, Nov. 30th-Dec. 4th, 1942.) (109/37 U.S.A.)

The purpose of this paper is to investigate the influence of several types of inclusions on the stress distribution in elastic plates under transverse flexure. An " inclusion " is defined as a close-fitting plate of some second material cemented into a hole cut in the interior of the elastic plate. Depending upon the properties of the material of which it is composed the inclusion is described as rigid or elastic. In particular, the solutions presented will deal with the effects of circular inclusions of differing degrees of elasticity and rigid inclusions of varying elliptical form. Since the rigid inclusion and the hole are limiting types of elastic inclusions, and the circular shape is a special form of the ellipse, plates with either a circular hole or a circular rigid inclusion are important special cases of this discussion. It is hoped that the present analysis of several types of inclusions will aid in a future study of perforated plates stiffened by means of reinforcing rings fitted into the holes.

Measurement of Dynamic Strain. (C. O. Dohrenwend and W. R. Meheffey, A.S.M.E. Preprint No. 18, Annual Meeting, Nov. 30th-Dec. 4th, 1942.) (109/38 U.S.A.)

The measurement of dynamic strains of both high and low frequency give rise to a variety of problems in instrumentation. Two types of equipment and circuits designed and used by the authors are discussed in detail. The first type based on the amplitude-modulated method is for low frequencies from zero to about 15 per cent. of the carrier frequency of 1,025 cycles per sec. The equipment has application to strain measurements varying from static values to those produced in moving vehicles, various machine parts, structures such as crane bridges, in fact all strain measurements where the frequency is 150 cycles per sec. or less. The second type of equipment discussed is a potentiometer type and is for high-frequency strain measurements from 100 cycles per sec. to 8,000 cycles per sec. This high-speed equipment is conveniently used for impact strain, such as produced in hammer blows, shock loading, forging equipment, and impact-factor determination. Both units are designed to be used with a cathode-ray oscillograph which lends itself to a variety of recording methods. The method discussed includes both the type where the time axis is obtained by sweeping the oscilloscope beam on a stationary film and where the time axis is obtained mechanically.

Hydrodynamic Three-Component Balance. (M. Medici, Wasserkraft und Wasserwirtschaft, Vol. 35, No. 2, 15/2/40, pp. 38-40.) (109/39 Italy.)

The balance is intended for measurement on model blade sections (app. 15 x 5 cm.) in the hydrodynamic tank of the Padova University.

The model is attached to a vertical spindle supported in ball-bearings at the ends of a cylinder. This cylinder in its turn is cardanically suspended so that it can rotate about two horizontal axes placed parallel to the surface of the water. Rotation about the fore and aft axis (parallel to the direction of flow), is due to lift whilst rotation about the other horizontal axis indicates drag. Rotation about the vertical axis is due to the moment of the hydrodynamic forces.

During a test, rotation about the axes is prevented by means of weights acting on pulleys. (Null method.)

It is stated that the balance is robust and yet sensitive. No springs or gears are required, the control forces being measured directly.

A series of photographs give details of the suspension.

New Instruments for Measuring Acceleration in Flight. (H. Freise and others, Luftwissen, Vol. 9, No. 8, August, 1942, pp. 245-247.) (109/40 Germany.)

The article describes in some detail two new types of accelerometer developed by the D.V.L. for flight research.

Both utilise the cantilever spring suspension for the inertia mass which is housed in a separate compartment containing the damping fluid and sealed off from the recording gear by means of a rubber diaphragm.

Contrary to the well known D.V.L. instruments used primarily for stress research operating by the scratch method and requiring subsequent optical magnification of the record, the new accelerometers give a direct record on wax paper requiring no subsequent magnification, its maximum deflection being of the order of 50 mm. The range covered is from -4 g. to $+8$ g., with an accuracy of about $\pm .05$ g.

Whilst the first model is primarily intended for vertical accelerations, the second is provided with an adjustment for sensitivity so that horizontal accelerations can be recorded with equal accuracy. Both instruments are of relatively small dimensions (18 x 10 x 9 cm. and 24 x 20 x 16 cm. respectively), the weight of the complete installations being 2 and 8 lbs. respectively. The heavier instrument will give records of one hour's duration.

An interesting development of these instruments is the " acceleration peak " recorder which counts and classifies automatically the number of maximum accelerations experienced by the aircraft over a given period (gust research).

In the instrument, the pointer which normally contacts the wax paper is fitted with a number of electrical contacts arranged on either side of a cross bar which is perpendicular to the pointer and at right angles to its direction of travel. These contacts move along a cylindrical bridge provided with a second set of contacts at gradual increasing arcual distance. Deflections of different amplitude thus bridge the gap at various positions and are recorded electrically on appropriate counters.

The instrument illustrated has 10 such contacts and covers the range -1.5 to 3·5 g. The accelerometer itself weighs 6 lb., the electrical counters 9 lb. The latter can be placed in any convenient position on the aircraft and joined by cables.

Measurement of High Temperature in High Velocity Gas Streams. (W. J. King, A.S.M.E. Preprint No. 19, Annual Meeting, Nov. 30th-Dec. 4th, 1942.) 109/41 U.S.A.)

Conventional methods of measuring temperatures are subject to considerable errors, when applied to gas streams at velocities about 500 fps. and temperatures at the order of 1600 F., which conditions occur, for example, in the exhaust-gas pipe of an aero engine. An investigation of this problem, the results of which are reported in the paper, was suggested by the Special Sub-committee on Exhaust Gas Turbines and Intercoolers of the N.A.C.A., and was carried out with the assistance of the Sub-committee on Exhaust Gas Temperature Measurement of the Committee on Industrial Instruments and Regulators. Tests were conducted on the thermocouple, which at present is the most satisfactory temperature-measuring device available, to develop a shield and mounting that would achieve maximum accuracy and minimum size and weight for aircraft application. The results indicate that something better than the ordinary thermocouple mountings is required for even a fair degree of accuracy with either the high velocities or temperatures considered. A few tentative devices are suggested which will serve until further studies have been made and more adequate solutions provided.

Plugging Porous Castings with Plastic. (A. Rehbock, Z.V.D.I., Vol. 86, No. 7-8, 21/2/42, p. 126.) (109/44 Germany.)

A high degree of gas-tightness is frequently required of castings employed in the construction of refrigeration plant. To ensure this is not always possible as metal castings are frequently permeated with fine pores with the result that it becomes necessary to increase the wall-thickness of the castings to a considerable extent if they are to be rendered adequately gas-tight. Lacquer coatings hitherto used to overcome this difficulty have not always proved satisfactory under actual working conditions. Two processes in this connection have recently been adopted whereby plastic material is used for plugging these porous cavities. This plastic

material is applied to the pores of the casting either in the form of a solution or as a liquid which subsequently hardens. The plastic materials most suitable for this purpose are polyvinylchloride and polystyrol.

In the first process an impregnating solution, PCU 3, is used. This consists of a solution of Igelit PCU of a certain grade of polymerisation mixed with suitable solvents. The viscosity and adhesion of this solution are of a consistency required for efficiently sealing up the porous cavities. The impregnation is best carried out in a special impregnating plant, the solution being applied to the pores under suction and pressure.

On heating (80°-90°C.) the solvent evaporates. The plastic is resistant to acid and lye as well as to the cooling agents usually employed for refrigeration (with the exception of sulphuric acid and methylchloride).

In the second process, monostyrol in thinly liquid state is applied to the pores. This synthetic resin polymerises on heating the castings and on applying pressure. The polystyrol thus obtained is still only resistant to ammonia if used for refrigeration purposes.

(From paper given at a session of the Committee for the Development of Refrigeration Technique of the V.D.I., 15.11.41.)

Impact Extrusion and Cold Pressing of Aircraft Parts. (Phil Koenig, S.A.E. Preprint No. 5, National Aircraft Production Meeting, Oct. 1-3, 1942.) (109/45 U.S.A.)

Many aircraft parts which would normally be produced by casting, forging, or by machining from solid stock, can be produced very rapidly and extremely economically by the impact-extrusion method.

Aluminium and aluminium alloys can be extruded by the Impact method. The only limit to the size of the parts so produced, is the power of the press that can be obtained for the work. Small parts can be produced on standard crank presses which are nearly always available. Any type of press can be used as it is not necessary to have a high speed, except, of course, in respect to production capacity. Hydraulic presses can be used to advantage. Small parts can be produced in multiple dies and, in this way, much large production obtained. It has been found by experiment that aluminium requires a pressure of approximately 45 tons per sq. inch for this production method while 24 s aluminium alloy requires a pressure of approximately 90 tons per sq. inch.

Impact-extrusion can be used advantageously as a method of producing a very satisfactory substitute for many parts that are now being made by the drop-hammer process. Because of the increasing difficulty in obtaining forgings, this substitute method should be rapidly promoted and used to the maximum extent possible.

The dies for the manufacture of parts produced by the Impact-extrusion method must have sufficient strength and proper heat-treatment to withstand the extreme pressures and impact shocks under the continuous operation imposed. During the flow period through which the metal passes, there is, as a consequence of the high pressures between the die surfaces and the flowing metal, considerable friction and, as a consequence, wear to be considered. It has been found that a plating of chromium is advantageous as it materially lengthens the life of the dies.

Chemical Protective Treatment and Cleansing Methods in Aircraft Production. (R. Sanders, J.S.A.E., Vol. 51, No. 1, Jan., 1943, pp. 23-30, Transactions.) (109/46 U.S.A.)

Chemical protective treatment for light alloys has the two-fold object of minimising corrosion and providing improved adhesion for subsequent painting. Of the three treatments in common use (anodising, chromatisation and phosphatisation) only the first (anodising) is sufficiently corrosion resistant not to require painting. It has the disadvantage, however, of requiring a rather elaborate electrolytic installation and is not suitable for large structural parts. Chromatisa-

tion is obtained by dipping in a chromic acid bath, whilst phosphatisation consists of a treatment with a phosphoric acid compound which may be carried out either by hand (swab), dipping or spray, and is thus easily applied to large surfaces, no special equipment being required. All other treatments require a preliminary degreasing of the surface which must be especially thorough when chromatisation is applied. This preliminary cleaning may be carried out by the emulsion, vapour or spray method, generally followed by an alkaline bath and water rinsing. Machines for carrying out this cleansing operation are described, special attention being paid to the special requirements in the case of Mg alloys.

The author also deals with the problem of cadmium plating on steel, copper and brass. Before any paint is applied to such deposits, the surface should be chromatised or phosphatised. Phosphoric acid compounds can also be applied to raw steel to retard corrosion and improve paint adhesion.

Successful spot welding also requires careful surface cleaning prior to the welding operation, since dirt or oxide affect the contact resistance and contaminate the electrodes.

In this case the cleansing agent usually contains hydrofluoric acid which may present a health hazard. It is interesting to note that a phosphoric acid compound (Koldweld) has been developed lately which is generally effective and contains no aggressively active acid or virulent poison. Use of this type of compound consists in a single cold dip, eliminating the use of hot caustic etch or alkaline solution.

Another development has been a compound in jelly form for treatment of sections which are too large to submerge in solution. This viscous compound is painted over the area and wiped off after one minute with a cloth damped with clean water. Spot welding can then be carried out satisfactorily.

Cyaniding of High Speed Tool Steels. (H. Schanmann, Der Betrieb, Vol. 21, No. 9, Sept., 1942, pp. 375-379.) (109/47 Germany.)

Cyaniding is a special surface hardening process carried out in a salt bath at temperatures between 500 and 550°C. It is only applicable to high speed tool steels, with a tempering temperature of the same order. The steels moreover should not be temper sensitive and the process cannot be applied to ordinary tool steels.

The bath consists mainly of a mixture of sodium and potassium cyanide, the temperature of which is kept about 20°C. below the tempering temperature of the steel. During the immersion, which lasts from 15 to 45 minutes, gaseous cyanogen compounds are evolved which necessitates efficient ventilation. The nitrided layer is very thin (20-30μ) but of considerable hardness (1,100-1,200 Vickers Units).

Satisfactory nitriding by this process can only be carried out if the surface of the tool is in good condition, and has not been decarbonised by previous re-hardening. The high speed steels employed should be hardened in such a way that a fine grain structure has become established before the cyaniding process is applied.

It appears that dimensional changes in the tool only become important when the tempering temperature of the particular steel is reached or exceeded.

On the other hand the hardness of the nitrided layer generally increases with the temperature of the cyanide bath. It is therefore essential for best results that the tempering temperature of the particular steel be known accurately and work with a bath temperature about 20-30°C. below this.

Excessive bath temperature or prolonged immersion leads to a reduction in the hardness of the nitrided layer. In this case the only remedy is annealing at 800-850°C. in the absence of air and fresh hardening. The article concludes with some data on the increase in tool life which can be obtained by proper application of the cyaniding process. In the case of spiral drills subjected to considerable wear, the life can be increased by at least 50 per cent. For broaches and milling

cutters even greater improvements have been noted. In the case of broaches, a 20 fold increase in life has been obtained in certain cases.

On the Significance of CO_2 for High Altitude Breathing. (Hermann Rein, Schriften der deutschen Akademie der Luftfahrtforschung, No. 32, 17th Jan., 1941.) (109/48 Germany.)

This paper reviews the experimental work carried out in the last few years on the function of CO_2 in the human organism, particularly at high altitudes. Experiment has shown that CO_2 is an effective antidote against altitude sickness and, on the basis of this knowledge, the advisability of using CO_2 and O_2 mixtures for high altitude, breathing has been advocated by various investigators.

The author shows that there are still many problems, some of them of a fundamental character, which require careful investigation. Too little is known, for example, about the influence of CO_2 on the respiratory mechanism and the part it plays in releasing oxygen from the blood to the tissues. It is shown that 3-5 per cent of CO_2 added to the respired air at high altitude can completely relieve tissue anoxia. The usual explanation given to account for this phenomenon is that CO_2 stimulates ventilation of the lungs and thus improves the arterialisation of the blood. These explanations are shown by the author to be incorrect. Tests showed conclusively that CO_2 acted on the tissue by way of the vegetative nervous system. How the latter affected the metabolism of the tissue is still a matter for further study.

The importance of the vegetative nervous system is borne out by experiments which were carried out as far back as 1932 at Cannons Laboratory in Boston. These experiments showed that though animals suffered no apparent harm when the sympathetic nervous system had been removed, they sustained serious injury under oxygen want.

The author concluded by emphasising the importance of the central nervous system which by virtue of its regulative control over respiration and circulation and its susceptibility to CO_2 will provide an answer to some of the outstanding problems of aviation medicine. It is interesting to note that according to the author the administration of drugs such as adrenalin sympatholor veritol will have no effect unless there is already an adequate supply of CO_2 in the body.

Welding Fumes from Arc Welding and Their Danger to Health. (G. C. Harold, J. Am. Soc. Nav. Engs., Vol. 54, No. 4, Nov., 1942, pp. 650-657.) (109/49 U.S.A.)

In general, potential sources of injury from arc welding other than from trauma and thermal effects seemingly may be grouped in the following categories:—

Oxygen deficiency.
Carbon monoxide.
Nitrous gases.
Ozone.
Metal fume from alloyed steel.
Metal fume from the metal electrodes.
Silica from welding rod coatings.
Harmful substances other than silica in rod castings.
Injurious substances coated on to the metal being welded.
Radiations.
Possible other gases such as cyanides theoretically produced in the electric arc.

From the author's experience and from his appraisal of the literature, it does not appear that the health of arc welders as a class may be set apart as especially different from metal workers in general. Although occasional records of deaths appear associated with some aspect of welding as the cause, we have no evidence of any prevailing diseases characteristic of the work of the arc welder (radiation effects excepted).

The following ventilation rates when welding with coated electrodes are recommended:—

	c.f.m.
Steel electrodes:—	
5/32 in. or less	250
3/16 in.	400
1/4 in.	700
5/16 in.	1,200
3/8 in.	1,500
Alloy electrodes (fluoride coated):	
5/32 in. or less	250
Galvanized plate:	
5/32 in.	1,000-1,500

Suitable suction devices connected to local exhaust hoods placed within 8 to 9 inches of the arc with a minimum air velocity of about 125 feet per minute for smaller electrodes are also recommended.

It should be remembered that if the welding is carried out in large open spaces, artificial ventilation will in general not be required.

Transportation of Patients by Aeroplane. (W. R. Lovelace and J. Hargreaves, J. Av. Med., 1942, Vol. 13, No. 1, pp. 2-25.) (Bull. of War Med., Vol. 3, No. 5, Jan., 1942, pp. 299-230.) (109/50 Great Britain.)

The first air ambulance in the U.S.A. was used in 1918. Since then they have been used with increasing frequency in various parts of the world. In the Spanish Civil War the journey from the battle front to Berlin took only 8-10 hours, and many flights were made at 16,000-18,000 ft. In the Polish campaign 2,500 patients were evacuated by this means, and the ambulance planes were used for bringing supplies to the front on the return trip. German press reports state that up to August, 1941, 280,000 wounded had been evacuated from the Eastern Front. The authors review briefly the literature on the administrative and medical problems associated with this form of transport. An outline of the requirements under various conditions is included.

The disadvantages of air ambulances are many; economic and administrative. There are also physiological problems. The decrease in pressure results in the symptoms of anoxæmia being normally first apparent at about 10,000 ft., but any conditions such as cardiac failure, anæmia, shock, severe head injury, severe infection or massive sulphonamide therapy, which impair the oxygen supply to the tissue, will require the use of additional oxygen at much lower altitudes.

The other effect of the fall in pressure is the expansion of the gases in, for example, a pneumothorax or the intestines. Such cases are best flown at as low an altitude as possible, or preferably in a pressure cabin.

Prevention and Control of Hazards in the Radium Dial Painting Industry. (L. F. Curtiss, J. Ind. Hyg. and Toxicol., 1942, Vol. 24, No. 6, pp. 131-141.) (Bull. of War Med., Vol. 3, No. 5, Jan., 1942, p. 301.) (109/51 Great Britain.)

Radium has almost entirely replaced mesothorium as an ingredient of self-luminous paint used for dials. Hence any harm experienced by workers using such paint may correctly be termed "radium poisoning." Radium emits three types of radiation, alpha, beta, and gamma rays. The alpha ray is a doubly charged atom of helium with low penetrating power. The beta ray is a high-speed electron with greater penetrating power. The gamma ray is an electro-magnetic wave, like the X-ray, and has still greater penetrating power. The immediate decomposition product of radium is the gas radon; from this gas the other radio-active members (which are solid) are derived. The final decomposition product is lead. Radium, like lead, when it gains entry to the body tends to collect in the bones.

After the radium has once been ingested and absorbed, there is no known way in which it can be again eliminated; it remains to exert its destructive effects. But the gas radon decays rapidly and will disappear in a few weeks after inhalation; indeed, the breathing process may completely eliminate the gas in about three or four hours. Ultra-violet light, such as a small argon lamp, may be used in a dark room to examine the hands and clothing of workers; it causes any deposits of radium paint to fluoresce brightly. Distance has a great effect in reducing the intensity of radiations; therefore, stocks of paint should be stored well away from work places. A method is described for determining radon present in air. Another device, developed by the author, is described, which may be used to determine gamma ray intensity; the tolerance limit is 0.1 roentgen per eight-hour day.

Zinc Dermatitis (An Additional Hazard in the Aircraft Industry). (H. E. Freeman, J. Amer. Mid. Ass., 1942, Vol. 119, No. 13, July, 1942, p. 1,016.) (Bull. of War Medicine, Vol. 3, No. 5, Jan., 1943, pp. 301-302.) (109/32 U.S.A.)

Zinc salts are used widely in the welding processes of aeroplane manufacture. The present record is of a man, 33 years of age, employed in an aircraft factory, who was burned at the bend of the left elbow by a splash of " kirksite," an alloy of zinc with a small admixture of aluminium, copper and magnesium. Zinc oxide was one of the ointments used in early treatment of the burn. Although the wound was healing when the patient came under observation, there was an erythemato-vesicular eruption for about 3 cm. in all directions around it.

The patient stated that his grandmother, mother and father were sensitive to zinc.

The condition was clearly allergic, and this was further confirmed by the " recurrent patch test reaction," i.e. the flare-up at previously involved sites on application of the test.

LIST OF SELECTED TRANSLATIONS.

No. 55.

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Lists of selected translations have appeared in this publication since September, 1938.

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AIRCRAFT (DESIGN AND PERFORMANCE).	
1697 Belleroche, P. ...	*Torpedo-Carrying Aircraft.* (La Science et la Vie, No. 282, Feb., 1941, pp. 76-77.)
1739 Scheubel, F. N. ...	*The Effect of the Density Gradient on the Longitudinal Motion of an Aircraft.* (L.F.F., Vol. 19, No. 4, 5/5/1942, pp. 132-136.)
1740 Kaul, H. W. ... Filzeh, B.	*Results of Measurements of Wing Stresses in Flight.* (Luftwissen, Vol. 8, No. 1, Jan., 1941, pp. 20-24.)
PRESSURE CABINS (GERMAN PATENTS DIGEST).	
1713 ——	*Pressure Cabin for Aircraft.* (*Henschel Aircraft Co., Patent No.* 678,457.) (Flugsport, Vol. 31, No. 16, 2/8/39, p. 45.)
1714 ——	*Packing Glands for Control Rods Passing Through the Walls of Pressure Cabins.* (*Henschel Aircraft Co., Patent No.* 680,689.) (Flugsport, Vol. 31, No. 20, 27/9/39, pp. 57-58.)
1715 ——	*Manhole Consisting of External and Internal Cover Plates for Pressure Cabins.* (*Henschel Aircraft Co., Patent No.* 680,562.) (Flugsport, Vol. 31, No. 20, 27/9/39, p. 57.)
1716 ——	*Pressure Chamber for Aircraft.* (*Dornier Aircraft Works, Patent No.* 705,929.) (Flugsport, Vol. 33, No. 17, 9/7/41, p. 29.)
1717 ——	*Pressure Regulating Valve for Pressure Cabins.* (*Arado Aircraft Co., Patent No.* 705,844.) (Flugsport, Vol. 33, No. 14, 9/7/41, p. 29.)
1718 ——	*Aircraft with One or More Pressure Cabins.* (*Focke-Wulf Aircraft Co., Patent No.* 678,516.) (Flugsport, Vol. 33, No. 20, 1/10/41, p. 49.)
ENGINES AND ACCESSORIES.	
1701 Schneider, E. ...	*Friction Tests in Plain and Roller Bearings.* (Petroleum Zeit., Vol. 26, No. 7, 1930, pp. 221-236, and No. 11, 1930, pp. 337-339.)

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1702	Mertz, R.	... ...	*Problems of Two-Stroke Engine Design.* (A.T.Z., Vol. 45, No. 6, 25/3/42, pp. 149-156.)
1709	Himmler, C. R.	...	*Torque Measurement of Aero Engines in Altitude Ground Tests and During Flight.* (Z.V.D.I., Vol. 84, No. 26, 29/6/40, pp. 445-454.) (Translated by the Bristol Aeroplane Co.)
1732	Pabst, O.	... ...	*Frictional Heat in Turbo Machinery.* (L.F.F., Vol. 19, No. 8, 20/8/1942, pp. 267-270.)
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1710	Prandtl, L.	... ...	*On the Resistance to Indentation (Hardness) and the Strength of Plastic Materials.* (Z.A.M.M., Vol. 1, No. 1, Feb., 1921, pp. 15-20.) (Translated by D.S.I.R.)
1711	Steuer, H.	... ...	*Plastics for Aircraft Production.* (Flugsport, Vol. 34, No. 21, Oct., 1942, pp. 315-330.)
1731	Geiger, F.	... ...	*Mechanical Testing and Grading of Wood for High Grade Structures.* (Flughafen, Vol. 10, No. 2-3, Feb.-Mar., 1942, pp. 13-20.)
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1698	Ziedentopf, H. and others	... ...	*New Measurements on the Sensitivity of Vision.* (Z. f. Instrum., Vol. 61, No. 11, 1941, pp. 372-380.)
1706	Schonwald, B.	...	*The Range of Optical Signals in Daylight.* (Z. f. Instrum., Vol. 62, No. 1, Jan., 1942, pp. 35-36.)
1728	Nagel, M.	... ...	*Investigation on the Loss of Definition in Air Photographs Due to the Translational Motion of the Camera as Affected by the Density of the Negative.* (Z. f. Wiss. Photographie Photophysik and Photochemie, Vol. 38, No. 9-10, Sept.-Oct., 1939, pp. 181-209.)

TITLES AND REFERENCES OF ARTICLES AND PAPERS SELECTED FROM PUBLICATIONS REVIEWED IN R.T.P.3.

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1	6123	G.B.	*Survey of Technical Progress in Military Aircraft during* 1942. (W. Nichols, Flight, Vol. 42, No. 1,775, 31/12/42, pp. 717-720.)
2	6145	U.S.S.R. ...	*Ramming Tactics Developed by the Soviet Air Force.* (R. B. Hotz, Flying, Vol. 31, No. 4, Oct., 1942, pp. 32 and 100.)
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4	6255	U.S.A. ...	*Basic Theory of the Dive Bomber.* (Aero Digest, Vol. 41, No. 4, Oct., 1942, pp. 210-212.)
5	6258	U.S.A. ...	*Changed Warfare (Invasion of Europe).* (J. A. Ward, Aero Digest, Vol. 41, No. 4, Oct., 1942, pp. 87-89 and 237-238.)
6	6273	G.B.	*Pilot's Seat of Laminated Plastic (Spitfire).* (Plastics, Vol. 7, No. 68, Jan., 1943, pp. 14-15.)

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8	6291	U.S.A.	...	*Bomb Bay Fuel Tank Installation in Flying Fortress.* (Aviation, Vol. 41, No. 9, Sept., 1942, p. 152.)
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15	6711	U.S.A.	...	*Comfortization of Military Aircraft (IV).* (A. A. Arnhym, Aero Digest, Vol. 41, No. 5, Nov., 1942, pp. 202-209, 278-282.)
16	6780	U.S.A.	...	*Airplanes Fit to Fight (with a List of the World's Best Military Aircraft).* (N. F. Silsbee, Mech. Eng., Vol. 64, No. 12, Dec., 1942, pp. 847-852.)
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35	6389	Germany	... *Me. 109 G.* (Flight, Vol. 43, No. 1,776, 7/1/43, p. 7.)
36	6397	Germany	... *Me. 115.* (Flight, Vol. 43, No. 1,776, 7/1/43, p. 23.)
37	6404	Germany	... *Focke Wulf 190 A3 (Photographs).* (Canadian Aviation, Vol. 15, No. 10, Oct., 1942, p. 38.)
38	6424	G.B. ...	... *Focke Wulf F.W. 190 Fighter.* (Engineer, Vol. 175, No. 4,541, 22/1/43, pp. 68-71.)
39	6444	Germany	... *Junkers Variable Pitch V.S. 5.* (Der Adler, No. 24, 1/12/42, pp. 746-747.)
40	6637	Germany	... *Focke Wulf Aircraft Types (1919 to Date).* (Der Flieger, Vol. 21, No. 6, June, 1942, pp. 166-172.)
41	6638	Germany	... *Asymmetrical Aircraft B.V. 141.* (Der Flieger, Vol. 21, No. 6, June, 1942, pp. 174-175.)
42	6639	Germany	... *Dornier 217 (Photographs).* (Der Flieger, Vol. 21, No. 6, June, 1942, p. 176.)
43	6648	Germany	... *He. 111 (Comparison of 1935 and 1942 Designs).* (Motor Schau, Vol. 6, No. 8, Aug., 1942, pp. 331-334.)
44	6652	Germany	... *Blind Flying Equipment in Ju. 52.* (Der deutsche Sportflieger, Vol. 9, No. 12, Dec., 1942, pp. 254-255.)
45	6825	Germany	... *Catapult Start of Do. 18 (Photo).* (Flugsport, Vol. 35, No. 2, 20/1/43, p. 17.)
			Military Types (U.S.A.).
46	6125	U.S.A.	... *Lockheed Ventura (Recognition Details).* (Flight, Vol. 42, No. 1,775, 31/12/42, p. 716a.)
47	6148	U.S.A.	... *Grumman "Avenger" (Silhouette).* (Flying and Pop. Av., Vol. 31, No. 4, Oct., 1942, p. 36.)
48	6149	U.S.A.	... *Martin Mars (Silhouette).* (Flying and Pop. Av., Vol. 31, No. 4, Oct., 1942, p. 36.)

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49	6150	U.S.A.	...	*Boeing "Sea Ranger"* (*Silhouette*). (Flying and Pop. Av., Vol. 31, No. 4, Oct., 1942, p. 37.)
50	6203	U.S.A.	...	*Aircraft of the U.S. Navy.* (W. L. Robinson, Sci. Am., Vol. 167, No. 6, Dec., 1942, pp. 246-249.)
51	6252	U.S.A.	...	*Ryan PT-25 Trainer.* (Aero Digest, Vol. 41, No. 4, Oct., 1942, pp. 198-202.)
52	6283	U.S.A.	...	*P. 40 Engine Installation.* (Aviation, Vol. 41, No. 9, Sept., 1942, p. 156.)
53	6296	U.S.A.	...	*Fairchild AT-13 Trainer* (*Duramold*). (Aviation, Vol. 41, No. 9, Sept., 1942, p. 225.)
54	6297	U.S.A.	...	*Harlow PC-5A Basic Trainer.* (Aviation, Vol. 41, No. 9, Sept., 1942, p. 231.)
55	6394	U.S.A.	...	*Brewster Bermuda* (*Identification Details*). (Flight, Vol. 43, No. 1,776, 7/1/43, p. b.)
56	6641	U.S.A.	...	*American Types with the R.A.F.* (*Fortress, Maryland, Liberator, Boston, and Havoc*). Der Flieger, Vol. 21, No. 6, June, 1942, pp. 180-181.)
57	6673	U.S.A.	...	*Douglas Boston II* (*Photograph*). (Aeroplane, Vol. 64, No. 1,652, 22/1/43, p. 91.)
58	6674	U.S.A.	...	*Brewster Bermuda* (*Photograph*). (Aeroplane, Vol. 64, No. 1,652, 22/1/43, p. 93.)
59	6679	U.S.A.	...	*North American Mitchell* (*Photograph*). (Aeroplane, Vol. 64, No. 1,652, 22/1/43, p. 104.)
60	6718	U.S.A.	...	*Identification of American Aircraft in the R.A.F. and Fleet Air Arm.* (Aero Digest, Vol. 41, No. 5, Nov., 1942, pp. 288, 292.)
61	6779	U.S.A.	...	*Grumman Martlet Deck Landing* (*Photo*). (Flying and Pop. Av., Vol. 31, No. 2, Aug., 1942, p. 55.)
62	6781	U.S.A.	...	*Martin Mars* (*Photograph*). (Mech. Eng., Vol. 64, No. 12, Dec., 1942, p. 908.)
				Military Types (*U.S.S.R.*).
63	6151	U.S.S.R.	...	*I. 16 Fighter.* (Flying and Pop. Av., Vol. 31, No. 4, Oct., 1942, p. 37.)
64	6242	U.S.S.R.	...	*Russian Modern Military Aircraft.* (Aero Digest, Vol. 41, No. 4, Oct., 1942, pp. 157-161 and 236-237.)
65	6281	U.S.S.R.	...	*Typical Soviet Aircraft.* (Aviation, Vol. 41, No. 9, Sept., 1942, pp. 100 and 186.)
66	6676	U.S.S.R.	...	*Tupolev S.B.-Z Medium Bomber* (*Photograph*). (Aeroplane, Vol. 64, No. 1,652, 22/1/43, p. 96.)
67	6693	France/ U.S.S.R.		*Some French and Russian Fighters* (*Silhouettes*). (Aeronautics, Vol. 7, No. 6, January, 1943, pp. 52-53.)
68	6824	U.S.S.R.	...	*Russian Medium Bomber DB-3F.* (Flugsport, Vol. 35, No. 2, 20/1/43, p. 16.)
				Military Types (*Japan and Italy*).
69	6147	Japan	...	*Mitsubishi OO Fighter* (*Silhouette*). (Flying and Pop. Av., Vol. 31, No. 4, Oct., 1942, p. 35.)
70	6393	Italy ...	...	*Macchi C. 202 Fighter* (*Identification Details*). (Flight, Vol. 43, No. 1,776, 7/1/43, p. a.)
71	6802	Italy ...	...	*Cant Z 1007 Asso Medium Bomber.* (Flugsport, Vol. 35, No. 1, 6/1/43, pp. 1-2.)

NO. ITEM	REF. R.T.P.		TITLE AND JOURNAL.
			Armament (Guns, Turrets and Armour).
72	6154	U.S.A. ...	*Tail Gunner on B-17E (Photo).* (Flying and Pop. Av., Vol. 31, No. 4, Oct., 1942, p. 53.)
73	6160	Germany ...	*Aircraft Machine Gun M.G. 131.* (Flugsport, Vol. 34, No. 26, 23/12/42, pp. 407-410.)
74	6257	U.S.A. ...	*The Armament of Big Bombers.* (J. I. .Waddington, Aero Digest, Vol. 41, No. 4, Oct., 1942, pp. 218, 241-244.)
75	6287	U.S.A. ...	*Aircraft Armour (Breeze Process).* (Aviation, Vol. 41, No. 9, Sept., 1942, pp. 120-122.)
76	6390	U.S.A. ...	*Tail Turrets on Liberator and Fortress (Photo).* (Flight, Vol. 43, No. 1,776, 7/1/43, p. 7.)
77	6406	Canada ...	*Arms and the Bomber (with Special Reference to Turrets).* (J. L. Waddington, Canadian Aviation, Vol. 15, No. 10, Oct., 1942, pp. 50 and 60.)
78	6426	U.S.A. ...	*"Fortress" Gunnery and Rear Fire.* (Engineer, Vol. 175, No. 4,541, 22/1/43, pp. 72-73.)
79	6607	G.B.	*Boulton Paul Turrets.* (Trade and Eng. Times, Vol. 52, No. 947, Jan., 1943, pp. 35-36.)
80	6743	Germany ...	*Aircraft Machine Gun M.G. 131.* (Luftwissen, Vol. 9, No. 12, Dec., 1942, p. 342.)
81	6754	Germany ...	*Sound-Proofed Firing Range for the Testing of Small Arms.* (Z.V.D.I., Vol. 86, No. 49-50, 12/12/42, p. 748.)
82	6837	Germany ...	*Ammunition Belt Container for Aircraft Guns.* (L.A.B. Pat. No. 727,860, Flugsport, Vol. 35, No. 2, 20/1/43, Pat. Series 46, p. 186.)
			Armament (Bombs and Dropping Gear).
83	6169	Germany ...	*Device for Spraying Liquid from Aircraft. (Pat. Series 44, No. 726,999.)* (E. Mirovsky, Flugsport, Vol. 34, No. 26, 23/12/42, p. 180.)
84	6171	Germany ...	*Device for Jettisoning Loads at Predetermined Time Intervals. (Pat. Series 44, No. 725,813.)* (H. List, Flugsport, Vol. 34, No. 26, 23/12/42, p. 180.)
85	6173	Germany ...	*Selector Gear for Single or Group Bombing. (Pat. Series 44, No. 725,370.)* (Siemens, Flugsport, Vol. 34, No. 26, 23/12/42, p. 179.)
86	6401	G.B.	*Standard R.A.F. Bomb Winch (Photo).* (Aeroplane, Vol. 164, No. 1,650, 8/1/43, p. 55.)
			Ballistics and Explosives.
87	6328	Germany ...	*The Effect of Physical and Mechanical Conditions on Detonation Characteristics of a Powdered Explosive containing Nitroglycerine.* (W. Schneider, Z.G.S.S., Vol. 37, No. 12, Dec., 1942, pp. 221-224.)
88	6329	Germany ...	*A Graphical Numerical Method for the Rapid Determination of the Accuracy of Gun Fire.* (F. Gabriel, Z.G.S.S., Vol. 37, No. 12, Dec., 1942, pp. 224-227.)
89	6330	Germany ...	*The Electrostatic Charge of Powdered Explosives and Liability to Explosions by Electrostatic Sparks.* (E. Kleider, Z.G.S.S., Vol. 37, No. 12, Dec., 1942, p. 227.)

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90	6331	Switzerland ...	*Possible Increase in Muzzle Velocity by Conical Bore of Gun.* (A. Stattbacher, Z.G.S.S., Vol. 37, No. 12, Dec., 1942, p. 229.)
			Military Transport Aircraft.
91	6610	U.S.A. ...	*Curtiss Commando Cargo Plane.* (Autom. Ind., Vol. 87, No. 9, 1/11/42, pp. 24-25.)
92	6672	U.S.A. ...	*Douglas C. 54 Transport "Skymaster" (Photograph).* (Aeroplane, Vol. 64, No. 1,652, 22/1/43, p. 87.)
93	6681	U.S.A. ...	*Lockheed "Constellation" Transport (Model).* (Aeroplane, Vol. 64, No. 1,652, 22/1/43, p. 109.)
94	6826	Germany ...	*Ju. 90 S Four-Engined Transport (Photo).* (Flugsport, Vol. 35, No. 2, 20/1/43, p. 16.)
			Parachutes.
95	6202	G.B.	*Bibliography of Published Information on German Parachutes (including Recent German Patents).* (R.T.P.3, Bibliography No. 79, Ministry of Aircraft Production, Jan., 1943.)
96	6720	U.S.A. ...	*One Man Parachute Boat.* (Aero Digest, Vol. 41, No. 5, Nov., 1942, p. 298.)
			Gliders.
97	6144	U.S.A. ...	*Glider Pick-up.* (J. Randolph, Flying, Vol. 31, No. 4, Oct., 1942, pp. 26-28.)
98	6159	Italy	*Typical Italian Gliders (Pavullo, Balilla, Nibro, Grifo, Cigona, etc.).* (Flugsport, Vol. 34, No. 26, 23/12/42, pp. 403-407.)
99	6251	U.S.A. ...	*Cargo Gliders.* (A. S. Ogden, Aero Digest, Vol. 41, No. 4, Oct., 1941, pp. 139-142.)
100	6282	U.S.A. ...	*U.S. Gliders and Paratroops.* (Aviation, Vol. 41, No. 9, Sept., 1942, pp. 101, 309-313.)
101	6294	G.B.	*British Glider Training.* (Aviation, Vol. 41, No. 9, Sept., 1942, p. 203.)
102	6409	Canada ...	*Ryan Plastic Trainer,* (Canadian Aviation, Vol. 15, No. 10, Oct., 1942, pp. 107 and 110.)
103	6410	Canada ...	*Glider Training.* (Canadian Aviation, Vol. 15, No. 10, Oct., 1942, p. 56.)
104	6642	Italy	*Italian Sailplanes,* (Der Flieger, Vol. 21, No. 6, June, 1942, pp. 182-184.)
105	6643	Switzerland ...	*Sailplane Catapult for Zurich Aero Club.* (Der Flieger, Vol. 21, No. 6, June, 1942, p. 188.)
106	6650	Germany ...	*New German World Record for Sailing Flight (45 hrs. 33mins.).* (Der deutsche Sportflieger, Vol. 9, No. 12, Dec., 1942, p. 250.)
107	6651	Germany ...	*Notes on Auxiliary Engines for Gliders.* (Der deutsche Sportflieger, Vol. 9, No. 12, Dec., 1942, p. 251.)
108	6714	U.S.A. ...	*Piper TG-8 Training Glider (Three-Seater).* (Aero Digest, Vol. 41, No. 5, Nov., 1942, pp. 224-225.)
109	6804	Sweden ...	*Sailing Flight in Sweden.* (Flugsport, Vol. 35, No. 1, 6/1/43, pp. 10-11.)
110	6810	Germany ...	*Tow-Rope Take-off for Autogyro Sail Planes (726,613), Patent Series No. 45.* (Focke, Flugsport, Vol. 35, No. 1, 6/1/43, p. 182.)
111	6817	U.S.A. ...	*Cargo Glider Pick-up.* (R. C. du Pont, A.S.M.E. Annual Meeting, Dec., 1942, Paper 105.)

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112	6827	Italy ...	...	*Two-Bolt Spar Fitted on Italian Sailplane Sparviero II* (*Diagrams*). (Flugsport, Vol. 35, No. 2, 20/1/43, pp. 17-18.)
113	6829	Germany	...	*Pilot's Flight Report of the New Sailplane Duration Record* (45 *h.* 33 *min.*). (E. Vergens, Flugsport, Vol. 35, No. 2, 20/1/43, pp. 25-27.)
				A.R.P.
114	6755	Germany	...	*Town Planning and Air Raid Precautions.* (Z.V.D.I., Vol. 86, No. 49-50, 12/12/42, p. 757.)
115	6777	Canada	...	*Fighting the Incendiary.* (E. Churchill, Flying and Pop. Av., Vol. 31, No. 2, Aug., 1942, pp. 42-44, 112.)
116	6785	U.S.A.	...	*Emergency Repairs to Gas Mains.* (C. S. Goldsmith, Mec. Eng., Vol. 64, No. 12, Dec., 1942, pp. 863-866.)
				Miscellaneous.
117	6146	U.S.A.	...	*Blimps.* (E. E. Burton, Flying, Vol. 31, No. 4, Oct., 1942, pp. 224-25 and 97-98.)
118	6391	G.B. ...	...	*Scenes on the Flight Deck of a Carrier* (*Photo*). (Flight, Vol. 43, No. 1,776, 7/1/43, pp. 8-9.)
119	6654	Germany	...	*Overhauling a U Boat* (*Photographs*). Der deutsche Sportflieger, Vol. 9, No. 12, Dec., 1942, pp. 260-262.)
				Aero- and Hydrodynamics.
120	6225	Japan	...	*Experiments on Rows of Aerofoils Under Conditions of Retarded Flow.* (Y. Shimoyana, Memoirs of the Faculty of Engineering, Vol. 8, No. 4, 1938, pp. 281-329.)
121	6308	G.B. ...	...	*Wave and Tidal Streams.* (P. J. H. Unna, Nature, Vol. 149, No. 3,773, 21/2/42, pp. 219-220.)
122	6450	U.S.A.	...	*Aeronautical Research.* (J. C. Hunsaker, J. Aeron. Sci. (Rev. Sec.), Vol. 1, No. 8, Nov., 1942, pp. 21 and 38.)
123	6544	U.S.A.	...	*The Dynamic Viscosity of Nitrogen.* (W. L. Sibbitt and others, Annual Meeting of the A.S.M.E., Power Division, 30 Nov.-4 Dec., 1942, pp. 1-4.)
124	6549	U.S.A.	...	*An Analysis of Gas Pipe Line Economics* (*Pipe Resistance*). (H. C. Lehn, Annual Meeting of the A.S.M.E., Power Division, 30 Nov.-4 Dec., 1942, pp. 1-11.) (Preprint No. 30.)
125	6600	Japan	...	*On the Permissible Roughness in the Laminar Boundary Layer.* (I. Tani and others, Aero. Res. Inst., Tokyo, No. 199, Oct., 1940, pp. 419-428.
126	6666	U.S.A.	...	*Nomograph for Pressure Drop in Isothermal Flow of Compressible Fluids.* (G. W. Thomson, Ind. and Eng. Chem. (Ind. Ed.), Vol. 34, No. 12, Dec., 1942, p. 1,485.)
127	6686	U.S.A.	...	*Newton and Aerodynamics* (*Resistance Laws*). (Th. van Kármán, J. Aeron. Sci., Vol. 9, No. 14, Dec., 1942, pp. 521-522.)

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128	6689	U.S.A. ...	*Elliptic Tunnel Wall Corrections on Drag and Stall.* (J. G. Gorvin and R. W. Hensel, J. Aeron. Sci., Vol. 9, No. 14, Dec., 1942, pp. 533-537.)
129	6706	U.S.A. ...	*Wind Tunnel Test and Actual Performance Data.* (H. G. Smith, Aero Digest, Vol. 41, No. 5, Nov., 1942, pp. 170, 272-279.)
130	6722	Germany ...	*Fluid Motion in Rotating Centrifugal Impellers (Experimental Investigations).* (E. Grunagel, V.D.I., Forschungsheft, No. 405, Nov.-Dec., 1940, pp. 1-21.)
131	6727	Germany ...	*Two-Dimensional Fields of Stress and Viscous Flow in the Case of Two Circular Boundaries (with Special Reference to the Case of the Rotating Cylinder).* (W. Muller, Ing. Archiv., Vol. 13, No. 1, Feb., 1942, pp. 37-58.) z
132	6739	Germany ...	*Photograph of Aircraft Jettisoning Fuel in Flight (Tip Vortices and Downwash).* (Luftwissen, Vol. 9, No. 10, Oct., 1942, p. 306.)
133	6758	Germany ...	*Speed Correction in Wind Tunnel Experiments (Digest).* (Z.V.D.I., Vol. 86, No. 49-50, 12/12/42, p. 755.)
134	6760	Switzerland ...	*Model Experiments on Cavitation in Centrifugal Pumps (Digest).* (Z.V.D.I., Vol. 86, No. 49-50, 12/12/42, pp. 756-757.)
135	6767	Germany ...	*Aerodynamic Forces on a Wing Fitted with a Lateral Plate (with Some Notes on the Effect of the Fuselage on the Rolling Moment and Lateral Force during Side Slip).* (J. Rotta, Ing. Archiv., Vol. 13, No. 3, 1942, pp. 119-131.)
136	6791	Germany ...	*A New Theory of Free Turbulence (Digest).* (W. Tollmien, Z.V.D.I., Vol. 86, No. 35-36, 5/9/42, pp. 553-554.)
137	6793	Germany ...	*Convenient Approximate Equations for Density and Pressure at Great Altitudes.* (F. Haber, Z.V.D.I., Vol. 86, No. 35-36, 5/9/42, p. 555.)
138	6818	U.S.A. ...	*Developments in the Measuring of Pulsating Flows with Inferential Head Meters.* (S. R. Beitler and others, A.S.M.E. Annual Meeting, Dec., 1942, Paper 106.)
139	6821	U.S.A. ...	*Desirable Characteristics of Valves and Final Control Elements for Cascade Control.* (P. W. Keppler, A.S.M.E. Annual Meeting, Dec., 1942, Paper No. 109.)

Aircraft, Airscrews and Accessories.

Construction and Design.

140	6165	Germany ...	*Wing Installation for Double Power Units (Two In-Line Engines Side by Side).* (*Pat. Series* 44, *No.* 726,495.) (Heinkel, Flugsport, Vol. 34, No. 26, 23/12/42, pp. 177-178.)
141	6172	Germany ...	*Device for Rapid Connection and Disconnection of Control Rods.* (*Pat. Series* 44, *No.* 726,531.) (Dornier, Flugsport, Vol. 34, No. 24, 23/12/42, p. 179.)

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142	6241	U.S.A.	...	*Fundamental Equations of Weight Control. (Value of a Pound Saved.)* (J. E. Ayers, Aero Digest, Vol. 4, No. 4, Oct., 1942, pp. 108-114 and 244-249.)
143	6246	U.S.A.	...	*Characteristics of Woods for Aircraft Structural Plywoods.* (R. C. Perkins, Aero Digest, Vol. 41, No. 4, Oct., 1942, pp. 181-190.)
144	6286	U.S.A.	...	*Future of Water Based Aircraft.* (F. T. Courtney, Aviation, Vol. 41, No. 9, Sept., 1942, pp. 116-119 and 285-286.)
145	6292	U.S.A.	...	*Aircraft Woods (Properties and Uses).* (Aviation, Vol. 41, No. 9, Sept., 1942, pp. 159 and 161.)
146	6385	G.B. ...	...	*Wooden Aircraft for War Purposes.* (Nature, Vol. 151, No. 3,818, 2/1/43, p. 17.)
147	6392	France	...	*Modern French Designs for Large Aircraft.* (Flight, Vol. 43, No. 1,776, 7/1/43, pp. 10-12.)
148	6412	Canada	...	*Developments in Plywood for Aircraft Construction.* (S. Erright, Canadian Aviation, Vol. 15, No. 10, Oct., 1942, pp. 73-90 and 84-86.)
149	6452	U.S.A.	...	*Aeronautical Progress during the Last Ten Years (Contributions by Leading American Aircraft, Engine and Equipment Firms).* Various, J. Aeron. Sci. (Rev. Sect.), Vol. 1, No. 8, Nov., 1942, pp. 39-158.)
150	6551	U.S.A.	...	*Plywood in Aircraft Construction.* (G. A. Allwood, Annual Meeting of the A.S.M.E., Power Division, 30 Nov.-4 Dec., 1942, pp. 1-3.)
151	6563	G.B. ...	...	*The Future of Civil Aviation.* (Engineer, Vol. 175, No. 4,542, 29/1/43, p. 83.)
152	6703	U.S.A.	...	*Low Carbon, Low Alloy Steel in Shell Type Aircraft Structures (Part 3).* (E. Schmued, Aero Digest, Vol. 41, No. 5, Nov., 1942, pp. 145-150.)
153	6713	U.S.A.	...	*Weight Control Engineering.* (W. F. Nicol, Aero Digest, Vol. 41, No. 5, Nov., 1942, pp. 216-218, 260.)
154	6717	U.S.A.	...	*Value of a Pound Saved by Weight Control (II).* (J. E. Ayers, Aero Digest, Vol. 41, No. 5, Nov., 1942, pp. 238-255.)
155	6735	Germany	...	*Strength Investigations on the Steel Spars of the Outer Wing of a Blenheim V.* (F. Glatz, Luftwissen, Vol. 9, No. 10, Oct., 1942, pp. 300-302.)
156	6803	Germany	...	*Flight Research Department at the Junkers Works (Development during Last 20 Years).* (Flugsport, Vol. 35, No. 1, 6/1/43, pp. 2-7.)
157	6805	Germany	...	*Metal Fuselage Construction (Composite Cylinders).* (727,196.) *Patent Series* 45. (Messerschmitt, Flugsport, Vol. 35, No. 1, 6/1/43, p. 181.)
158	6806	Germany	...	*Trap Door for Load Release from Hatches.* (727,219.) *Patent Series* **45.** (Heinkel, Flugsport, Vol. 35, No. 1, 6/1/43, p. 181.)
159	6807	Germany	...	*High Lift Flap (Slotted and Fitted with Tab).* (727,459.) *Patent Series* 45. (Messerschmitt, Flugsport, Vol. 35, No. 1, 6/1/43, p. 181.)

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160	6808	Germany ...	*Locking Device for Folding Wings.* (727,460.) *Patent Series* 45. (Fieseler, Flugsport, Vol. 35, No. 1, 6/1/43, pp. 181-182.)
161	6809	Germany ...	*Combination of Nose Slat and Adjustable Wing Nose.* (694,916.) *Patent Series* 45. (Messerschmitt, Flugsport, Vol. 35, No. 1, 6/1/43, p. 182.)
162	6811	Germany ...	*Aircraft with Two Single Blade Rotors which can be Linked to Form a Stationary Lifting Surface.* (725,769.) *Patent Series* 45. (Dornier, Flugsport, Vol. 35, No. 1, 6/1/43, p. 183.)
163	6812	Germany ...	*Wing Flaps Capable of Auto-Rotation.* (727,298.) *Patent Series* 45. (Henschel, Flugsport, Vol. 35, No. 1, 6/1/43, p. 183.)
164	6813	Germany ...	*Tail Wheel Elastic Mounting.* (725,968.) *Patent Series* 45. (Gotha, Flugsport, Vol. 35, No. 1, 6/1/43, p. 183.)
165	6814	Germany ...	*Tail Wheel Elastic Mounting.* (726,650.) *Patent Series* 45. (Heinkel, Flugsport, Vol. 35, No. 6/1/43, pp. 183-184.)
166	6815	Germany ...	*Nose Wheel Installation Alongside Engine (Unsymmetrical Engine Installation.)* (727,197.) *Patent Series* 45. (Arado, Flugsport, Vol. 35, No. 1, 6/1/43, p. 184.)
167	6831	Germany ...	*Reports of the German Academy of Aeronautical Research (New Series of Publications). Contents of No. 1: Assisted Take-off; Increase of Max. Lift by Wing Vibration; Bending Vibrations of Supercharger Blades, etc.* (Flugsport, Vol. 35, No. 2, 20/1/43.)
168	6832	Germany ...	*Fuselage with Nose and Tail Engine Installation.* (Dornier Patent No. 728,044, Flugsport, Vol. 35, No. 2, 20/1/43, Pat. Series 46, p. 185.)
169	6833	Germany ...	*Pressure Cabin.* (Arado, Pat. No. 728,045, Flugsport, Vol. 35, No. 2, 20/1/43, Pat. Series 46, p. 185.)
170	6834	Germany ...	*Nose Slat with Constant Leading Edge Profile.* (Arado, Pat. No. 727,799, Flugsport, Vol. 35, No. 2, 20/1/43, Pat. Series 46, p. 185.)
171	6835	Germany ...	*Slotted Spoilers.* (Junkers, Patent No. $727,732$, Flugsport, Vol. 35, No. 2, 20/1/43, Patent Series 46, pp. 185-186.)
172	6836	Germany ...	*Adjustable Wing Nose.* (D.V.L., Pat. No. $727,712$, Flugsport, Vol. 35, No. 2, 20/1/43, Pat. Series 46, p. 186.)
173	6838	Germany ...	*Auxiliary Skids for Take-off on Snow.* (Heine, Pat. No. 728,046, Flugsport, Vol. 35, No. 2, 20/1/43, Patent Series 46, pp. 187-188.)
174	6839	Germany ...	*Elastic Rubber Mounting for Aircraft Wheels.* (M.G., Pat. No. 726,998, Flugsport, Vol. 35, No. 2, Patent Series 46, p. 188.)
			Performance and Control.
175	6344	U.S.A. ...	*Ground Vibration Tests.* (C. D. Pengelley, J. Aeron. Sci., Vol. 9, No. 3, Nov., 1942, pp. 481-490.)

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176	6345	U.S.A.	...	*Determination of Airplane Critical Altitude by Flight Tests.* (L. C. Miller, J. Aeron. Sci., Vol. 9, No. 3, Nov., 1942, pp. 491-496.)
177	6346	U.S.A.	...	*Vector Solution of the Three-Degree Case of Wing Bending, Wing Torsion, Aileron Flutter.* (I. Arnold, J. Aeron. Sci., Vol. 9, No. 3, Nov., 1942, pp. 497-500.)
178	6636	G.B. ...	...	*Sperry Automatic Pilot.* (*B. Patent No.* 547,484.) (Engineering, Vol. 155, No. 4,021, 5/2/43, p. 120.)
179	6685	U.S.A.	...	*New Developments in Simplified Control.* (R. H. Upson, J. Aeron. Sci., Vol. 9, No. 14, Dec., 1942, pp. 515-520 and 548.)
180	6687	U.S.A.	...	*Proportioning a "Canard" Airplane for Longitudinal Stability and Safety Against Stall.* (J. V. Foa, J. Aeron. Sci., Vol. 9, No. 14, Dec., 1942, pp. 523-528.)
181	6816	Germany	...	*Utilisation of Pressure in Hydraulic Retractable Undercarriage System for Load and Trim Determinations (Aircraft on Ground).* (725,196.) *Patent Series* 45. (Ehrhardt, Flugsport, Vol. 35, No. 1, 6/1/43, p. 184.)
				Equipment (Ground and Maintenance).
182	6114	G.B. ...	...	*Soil Mechanics in Road and Aerodrome Construction (Discussion).* (A. H. Markwick, J. Inst. Civil Engs. Supplement, No. 8, 1941-1942, Oct., 1942, pp. 506-521.)
183	6174	Germany	...	*Lifting Tackle for Loading Aircraft.* (*Pat. Series* 44, *No.* 725,509.) (Heinkel, Flugsport, Vol. 34, No. 26, 23/12/42, pp. 179-180.)
184	6223	G.B. ...	...	*Aircraft Landing Grounds.* (Engineer, Vol. 175, No. 4,539, 8/1/43, p. 32.)
185	6276	G.B. ...	...	*Servicing Civil Aircraft.* (Trade and Engineering Times, Vol. 52, No. 946, Dec., 1942.)
186	6618	U.S.A.	...	*Aircraft Hangars Made of Bonded Plywood (Photo).* (Autom. Ind., Vol. 87, No. 9, 1/11/42, p. 92.)
187	6619	G.B. ...	...	*Introduction to Soil Mechanics.* (W. L. Lowe-Brown, Engineer, Vol. 175, No. 4,543, 5/2/43, pp. 104-106.)
188	6695	G.B. ...	...	*Air Ports and Their Planning.* (F. G. Miles, Aeronautics, Vol. 7, No. 6, Jan., 1943, pp. 60-61.)
189	6731	Germany	...	*Repair and Maintenance of Aircraft in the Field.* (Luftwissen, Vol. 9, No. 11, Nov., 1942, pp. 318-319.)
190	6776	Canada	...	*Flight Strips.* (S. S. Hanks, Flying and Pop. Av., Vol. 31, No. 2, Aug., 1942, pp. 25-26, 90.)
191	6778	Canada	...	*Portable Steel Runways.* (G. R. Reiss, Flying and Pop. Av., Vol. 31, No. 2, Aug., 1942, pp. 45-46.)
				Equipment (Electrical).
192	6321	G.B. ...	...	*Cable Weights.* (*R.T.P. Translation No.* 1,475.) (Airc. Prod., Vol. 5, No. 51, Jan., 1943, pp. 23-24.)

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193	6704	U.S.A. ...	*Electrical System Testing of "Lightning" Aircraft.* (Aero Digest, Vol. 41, No. 5, Nov., 1942, pp. 153, 385.)
194	6705	U.S.A. ...	*Proposed C.A.A. Regulations for Aircraft Electrical Assemblies.* (Aero Digest, Vol. 41, No. 5, Nov., 1942, pp. 154-168, 255-256.)
195	6708	U.S.A. ...	*Behaviour of Electrical Equipment at High Altitudes.* (N. J. Clark, Aero Digest, Vol. 41, No. 5, Nov., 1942, pp. 189-190.)
196	6712	U.S.A. ...	*Quick Disconnect Electric Plugs for Aircraft.* (D. H. Lonkota, Aero Digest, Vol. 41, No. 5, Nov., 1942, pp. 210-215.)
			Equipment (De-icing).
197	6710	U.S.A. ...	*Electronic Control of De-Icing Equipment.* (W. Kliever, Aero Digest, Vol. 41, No. 5, Nov., 1942, pp. 197-198, 267-268.)
198	6206	U.S.A. ...	*Electric Ice Indicator for Aircraft.* (Sci. Am., Vol. 167, No. 6, Dec., 1942, p. 280.)
			Model Aircraft.
199	6161	Germany ...	*Classification and Regulations for Aircraft Model Flight Competitions.* (Flugsport, Vol. 34, No. 26, 23/12/42, pp. 415-418.)
200	6222	G.B.	*The Langley Aeroplane of 1903.* (Engineer, Vol. 175, No. 4,539, 8/1/43, p. 32.)
201	6261	G.B.	*The 1914 Tests of the Langley Aerodrome.* (C. G. Abbot, J. Roy. Aeron. Soc., Vol. 46, No. 384, Dec., 1942, pp. 291-296.)
			Airscrews.
202	6162	Germany ...	*Locking Device for V.P. Airscrews.* (*Pat. Series 44, No. 727,502.*) (V.D.M., Flugsport, Vol. 34, No. 26, 23/12/42, p. 177.)
203	6163	Germany ...	*Airscrew Installation for Gliders Fitted with Auxiliary Motors.* (*Pat. Series 44, No. 726,494.*) (H. Wunscher, Flugsport, Vol. 34, No. 26, 23/12/42, p. 177.)
204	6164	Germany ...	*Central Contra-Prop Operated by Two Wing Engines.* (*Pat. Series 44, No. 726,862.*) (C. R. Wasiege, Flugsport, Vol. 34, No. 26, 23/12/42, p. 177.)
205	6219	G.B.	*Hydulignum Laminated Wood Airscrews.* (Engineering, Vol. 155, No. 4,017, 8/1/43, pp. 27-28 and 30.)
206	6220	G.B.	*Suffolk Windmills.* (R. Wailes, Engineering, Vol. 155, No. 4,017, 8/1/43, pp. 34-35.)
207	6277	G.B.	*Hydulignum Airscrews.* (Trade and Engineering Times, Vol. 52, No. 946, Dec., 1942, p. 36.)
208	6411	Canada ...	*Painting Airscrews for Camouflage.* (Canadian Aviation, Vol. 15, No. 10, Oct., 1942, p. 64.)
209	6422	G.B.	*Suffolk Windmills.* (R. Wailes, Engineering, Vol. 155, No. 4,019, 22/1/43, pp. 78-79.)
210	6616	U.S.A. ...	*Curtiss Contra-Prop. (Electric Control) (Photo).* (Autom. Ind., Vol. 87, No. 9, 1/11/42, p. 48.)

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211	6830	Germany ...	*Auxiliary Lifting Screw for Take-off and Landing of Normal Aircraft (Projects).* (Flugsport, Vol. 35, No. 2, 21/1/43, p. 27.)

Engines and Accessories.

Design.

212	6655	U.S.A./G.B. France/Italy	*2,000 h.p. Engine Projects (American, British, French and Italian).* (Der deutsche Sportflieger, Vol. 9, No. 12, Dec., 1942, p. 263.)
213	6677	G.B./U.S.A. Germany	*Engine Mountings (Comparison of British, German and American Practice).* (Aeroplane, Vol. 64, No. 1,652, 22/1/43, pp. 98-100.)
214	6732	Germany/G.B. U.S.S.R./ France	*Design Characteristics of Modern Enemy Aero Engine Pistons (British, American, French and Russian).* (H. Schwarz, Luftwissen, Vol. 9, No. 11, Nov., 1942, pp. 320-328.)
215	6733	Germany ...	*Design Characteristics of Foreign Aero Engine Pistons (British, American, French and Russian).* (H. Schwarz, Luftwissen, Vol. 9, No. 10, Oct., 1942, pp. 283-289.)
216	6744	Germany ...	*The Present State of German and Foreign Aero Engine Design (Digest of Lilienthal Lecture).* (Luftwissen, Vol. 9, No. 2, Dec., 1942, p. 365.)
217	6746	Germany ...	*Fundamental Problems of Aero Engine Design.* (A. Gimon, Luftwissen, Vol 9, No. 12, Dec., 1942, pp. 356-360.)
218	*6796	Germany ...	*Brown Boveri Gas Turbine Locomotive (Electric Transmission).* (Z.V.D.I., Vol. 86, No. 35-36, 5/9/42, pp. 549-557.)
219	6799	Germany ...	*Prohibition of I.C. Locomotive Construction in Germany.* (Z.V.D.I., Vol. 86, No. 35-36, 5/9/42, p. 557.)

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220	6124	G.B.	*Bristol Engine School.* (Flight, Vol. 42, No. 1,775, 31/12/42, pp. 721-722.)
221	6289	U.S.A. ...	*N.A.C.A. Engine Laboratory.* (Aviation, Vol. 41, No. 9, Sept., 1942, pp. 133 and 314-317.)
222	6313	G.B.	*Factors Determining Fuel Economy in Carburettor Engine.* (L. Mantell, Automobile Engineer, Vol. 33, No. 432, Jan., 1943, pp. 19-26.)
223	6456	U.S.A. ...	*Rating Supercharged Engines on the Basis of the Mean Temperature of the Cycle.* (R. Miller, Annual Meeting of the A.S.M.E., Power Division, Nov. 30th-Dec. 4th, 1942, pp. 1-6.)
224	6701	U.S.A. ...	*Sub-Zero Engine Tests (Cyclone).* (Aero Digest, Vol. 41, No. 5, Nov., 1942, p. 90.)

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225	6285	U.S.A. ...	*Lawrance Auxiliary Power Unit (15 h.p.).* (B. Reynolds, Aviation, Vol. 41, No. 9, Sept., 1942, pp. 112-115 and 317.)
226	6325	G.B.	*Merlin "Power Egg" Engine (Alvis System of Construction).* (Airc. Prod., Vol. 5, No. 51, Jan., 1943, pp. 37-40.)

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227	6388	France ...	*Gnome-Rhone 18 R. 2,000 h.p. Radial.* (Flight, Vol. 43, No. 1,776, 7/1/43, p. 7.)
228	6417	G.B.	*The Development of the Doxford Marine Oil Engine.* (W. Ker Wilson, Engineering, Vol. 155, No. 4,019, 22/1/43, pp. 61-64 and 70.)
229	6606	G.B.	*Rolls Royce Merlin 61.* (Trade and Eng. Times, Vol. 52, No. 947, Jan., 1943, p. 33.)
230	6615	Germany ...	*B.M.W. 801 A Engine* (11). (Autom. Ind., Vol. 87, No. 9, 1/11/42, pp. 38-41.)
231	6626	Germany ...	*Petrol Injection System in B.M.W. 801 Engine.* (Engineer, Vol. 175, No. 4,543, 5/2/43, pp. 109-111.)
232	6640	Germany ...	*B.M.W. 801 Engine.* (Der Flieger, Vol. 21, No. 6, June, 1942, pp. 177-179.)
233	6694	G.B.	*Radial Engine Installations (Hercules and B.M.W.).* (Aeronautics, Vol. 7, No. 6, Jan., 1943, pp. 54-55.)
			Bearings and Manifolds.
234	6217	G.B.	*Bearing Metals and Bearings for I.C. Engines.* (J. W. Donaldson, Metal Industry, Vol. 62, No. 2, 8/1/43, pp. 21-23.)
235	6244	U.S.A. ...	*Rust Proof Coatings for Manifolds.* (R. H. Wendt, Aero Digest, Vol. 41, No. 4, Oct., 1942, p. 162.)
236	6290	U.S.A. ...	*Cleaning and Relubrication of Anti-Friction Bearings on a Mass Scale.* (Aviation, Vol. 41, No. 9, Sept., 1942, pp. 135-138.)
237	6302	U.S.A. ...	*Flow Production of Engine Manifolds (Ryan).* (E. A. Moore, Machinist, Vol. 86, No. 37, 26/12/42, p. 238 EA.)
238	6354	G.B.	*Silver for Aero Engine Bearings.* (Machinery, Vol. 61, No. 1,571, 19/11/42, p. 577.)
239	6378	G.B.	*Cleaning Small Bearings.* (Machinery, Vol. 61, No. 1,573, 3/12/42, p. 623.)
240	6611	U.S.A. ...	*Manufacture of Exhaust Manifolds for Radial Engines.* (E. A. Moore, Autom. Ind., Vol. 87, No. 9, 1/11/42, pp. 26-29, 72-74.)
241	6742	Germany ...	*S.K.F. Conical Roller Bearings (Digest).* (Luftwissen, Vol. 9, No. 12, Dec., 1942, p. 355.)
242	6749	Germany ...	*Fatigue Fracture of Master Connecting Rod Due to Hypocycloidal Rotation of Bearing Sleeve (Opposing Direction of Engine Rotation).* (E. Bruder and G. Gimbel, Luftwissen, Vol. 9, No. 12, Dec., 1942, pp. 353-355.)
243	6819	U.S.A. ...	*Experiments on Bearing Performance.* (R. J. S. Pigott and others, A.S.M.E. Annual Meeting, Dec., 1942, Paper 107.)
			Compressors and Pumps.
244	6186	U.S.A. ...	*Pump with Flexible Rubber Tube Action.* (Machinery, Vol. 61, No. 1,577, 31/12/42, pp. 748-749.)
245	6557	G.B.	*A New Rotary Air Compressor.* (A. J. R. Lysholm, Engineering, Vol. 155, No. 4,020, 29/1/43, pp. 97-100.)

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246	6771	U.S.A. ...	*The Supercharging of Two-Stroke Diesel Engines.* (F. Oederlin, Mech. Eng., Vol. 64, No. 11, Nov., 1942, pp. 779-783.)
			Fuel Tanks and Radiators.
247	6166	Germany ...	*Sub-Divided Wing Condenser for Vapour-Cooled Power Plants Incorporating Condensate Delivery Pumps.* (*Pat. Series* 44, *No.* 726,529.) (Heinkel, Flugsport, Vol. 34, No. 26, 23/12/42, p. 178.)
248	6167	Germany ...	*Air Venting System for Skin Condensers.* (*Pat. Series* 44, *No.* 726,530.) (Heinkel, Flugsport, Vol. 34, No. 26, 23/12/42, p. 178.)
249	6168	Germany ...	*Pumping Installation for Fuel or Coolant on Aircraft.* (*Pat. Series* 44, *No.* 726,496.) (Heinkel, Flugsport, Vol. 34, No. 26, 23/12/42, p. 178.)
250	6170	Germany ...	*Rubber Plastic Cover for Metal Fuel Tanks.* (*Pat. Series* 44, *No.* 725,198.) (O. Raspe, Flugsport, Vol. 34, No. 26, 23/12/42, pp. 178-179.)
251	6702	U.S.A. ...	*Calibration of Aircraft Fuel Tanks.* (R. C. Moeller, Aero Digest, Vol. 41, No. 5, Nov., 1942, pp. 139-140, 263.)
			Ignition Systems.
252	6272	G.B.	*Mechanism of Creep Path Formations (Electric Leakage on Organic Insulators).* (Plastics, Vol. 7, No. 68, Jan., 1943, pp. 9-14.)
253	6715	U.S.A. ...	*Ignition Shielding Design.* (J. J. Mascuch, Aero Digest, Vol. 41, No. 5, Nov., 1942, pp. 227-230, 396.)
			Fuels and Lubricants.
			Combustion Theory.
254	6176	G.B.	*Influence of Water Vapour on Flame Gas Temperature.* (W. T. David and J. Mann, Nature, Vol. 150, No. 3,809, 31/10/42, pp. 521-522.)
255	6333	Germany ...	*Flame Speed and Ignition Velocity of Coke Oven Gas/Air Mixtures.* (W. Heilegen-staedt, Gas, Vol. 14, No. 5, May, 1942, pp. 73-77.)
256	6380	G.B.	*Condition of Freshly Burnt Gases.* (W. T. David and A. G. Gaydon, Nature, Vol. 150, No. 3,813, 28/11/42, p. 636.)
257	6554	U.S.S.R. ...	*Physical Chemistry in the Soviet Union.* (Ind. and Eng. Chem., Vol. 20, No. 23, 10/12/42, pp. 1,576-1,577.)
			Knock Rating and High Octane Fuels.
259	6235	U.S.A. ...	*High Octane Fuels by Polymerisation and Alkylation of Cracking Gases.* (V. N. Ipatieff, Ind. and Eng. Chem., Vol. 20, No. 21, 10/11/42, pp. 1,367-1,368.)
			Gaseous Fuels and Gas Analysis.
260	6196	Italy	*Supercharged Gas Generators.* (l'Auto Italiana, Vol. 23, No. 32, 20/11/42, pp. 15-18.)
261	6315	G.B.	*Pressure Charged Gas Producers.* (F. C. Sheffield, Automobile Engineer, Vol. 33, No. 432, Jan., 1943, pp. 31-36.)

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262	6316	G.B.	... ...	*Alternative Fuels.* (Automobile Engineer Vol. 33, No. 432, Jan., 1943, p. 36.)
263	6448	U.S.A.	...	*Determination of Low Concentration of O_2 in Gases.* (J. A. Shaw, Ind. and Eng. Chem. (Anal. Ed.), Vol. 14, No. 11, 15/11/42, pp. 891-892.)
264	6698	U.S.A.	...	*Low Temperature Carbonization Coke Developments.* (Ind. and Eng. Chem. (News Ed.), Vol. 20, No. 22, 25/11/42, p. 1,521.)
				Lubricating Oils.
265	6667	U.S.A.	...	*Viscosity of Lubricating Oils Saturated with Natural Gases at High Pressure.* (J. S. Sibearingen and E. D. Redding, Ind. and Eng. Chem. (Ind. Ed.), Vol. 34, No. 12, Dec., 1942, pp. 1,496-1,498.)
				Theory of Elasticity.
				General.
266	6115	G.B.	... ...	*Effect of Rate of Loading on the Mechanical Properties of Some Material (Discussion). (Reference to Shock Waves in Flexible fuel Tanks.)* (R. H. Evans, J. Inst. Civil Engs., Supplement to No. 8, Oct., 1942, pp. 563-567.)
267	6218	G.B.	... ...	*The Problem of Combined Stress.* (J. J. Guest, Engineering, Vol. 155, No. 4,017, 8/1/43, pp. 21-23.)
268	6348	U.S.A.	...	*Rational Analysis of Tension-Field Beams.* (H. W. Sibert, J. Aeron. Sci., Vol. 9, No. 3, Nov., 1942, pp. 510-514.)
269	6423	G.B.	... ...	*The Extreme Properties of Matter (Characteristics of the Solid State and Elasticity).* (C. G. Darwin, Engineer, Vol. 175, No. 4,541, 22/1/43, pp. 65-67.)
270	6425	G.B.	... ...	*Extreme Strength of Metals (Probability Configuration).* (Engineer, Vol. 175, No. 4,541, 22/1/43, p. 72.)
271	6439	G.B.	... ...	*Hardness and Lattice Distortion.* (Metal Industry, Vol. 62, No. 4, 22/1/43, p. 54.)
272	6489	U.S.A.	...	*The Relation of Structural Mechanics to Structural Engineering.* (H. Cross, Procs. 5th International Congress for Applied Mechanics, 1939, 1-8.)
273	6491	U.S.A.	...	*The Behaviour of Metallic Materials in the Range of Small Deformations.* (F. Koerber, Procs. of the 5th International Congress for Applied Mechanics, 1939, pp. 20-33.)
274	6493	U.S.A.	...	*On the Stress Increase in Notched Bars.* (E. Weinel, Procs. of the 5th International Congress for Applied Mechanics, 1939, pp. 51-53.)
275	6496	U.S.A.	...	*A Discussion of Thin Shell Theory.* (L. H. Donnell, Procs. of the 5th International Congress for Applied Mechanics, 1939, pp. 66-70.)
276	6498	U.S.A.	...	*A Graphical Torsion Analysis.* (H. C. Perkins, Procs. of the 5th International Congress for Applied Mechanics, 1939, pp. 175-179.)

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277	6500	U.S.A.	...	*On Tension Field Theory.* (E. Reissner, Procs. of the 5th International Congress for Applied Mechanics, 1939, pp. 88-92.)
278	6501	U.S.A.	...	*Generalisation of the Problem of Saint-Venant.* (C. F. F. Platrier, Procs. of the 5th International Congress of Applied Mechanics, 1939, pp. 102-106.)
279	6503	U.S.A.	...	*Gravitational Stresses in Bipolar Co-ordinates.* (R. D. Mindlin, Procs. of the 5th International Congress for Applied Mechanics, 1939, pp. 112-116.)
280	6504	U.S.A.	...	*Theory of Elasticity with Large Displacements and Rotations.* (M. A. Biot, Procs. of the 5th International Congress for Applied Mechanics, 1939, pp. 117-122.)
281	6561	G.B. ...	..	*Free and Forced Selections of Continuous Beams (Admittance Method).* (W. J. Duncan, Phil. Mag., Vol. 34, No. 228, Jan., 1943, pp. 49-63.)
282	6630	G.B. ...	...	*Problem of Combined Stress.* (J. J. Guest, Engineering, Vol. 155, No. 4,021, 5/2/43, pp. 101-102.)
283	6632	G.B. ...	...	*Extreme Properties of Matter (Strength Limit of the Solid State).* (C. G. Darwin, Engineering, Vol. 155, No. 4,021, 5/2/43, pp. 105-106.)
284	6688	U.S.A.	...	*Application of Maclaurin Series to Beams Under Simultaneous Transverse and Axial Loading.* (A. G. Strandhagen, J. Aeron. Sci., Vol. 9, No. 14, Dec., 1942, pp. 529-532.)
285	6763	G.B. ...	...	*Dynamic Stiffness and Effective Inertia in Modern Torsional Vibration Theory.* (R. G. Manley, J. Roy. Aeron. Soc., Vol. 47, No. 385, Jan., 1943, pp. 5-21.)
286	6764	G.B. ...	...	*The Electro-Mechanical Analogy in Oscillation Theory.* (R. G. Manley, J. Roy. Aeron. Soc., Vol. 47, No. 385, Jan., 1943, pp. 22-26.)
287	6769	Germany	...	*The Pressure Distribution Below Elastically Mounted Supports.* (G. Schubert, Ing. Archiv., Vol. 13, No. 3, 1942, pp. 132-147.)
288	6792	Germany	...	*Simplified Method of Evaluating Three-Dimensional Stress-Optical Experiments.* (A. Kuske, Z.V.D.I., Vol. 86, No. 35-36, 5/9/42, pp. 541-544.)
				Structures.
289	6347	U.S.A.	...	*Predicting Stiffener and Stiffened Panel Crippling Stresses.* (H. B. Crockett, J. Aeron. Sci., Vol. 9, No. 3, Nov., 1942, pp. 501-509.)
290	6492	U.S.A.	...	*The Buckling of a Cylindrical Tank of Variable Thickness Under External Pressure.* (C. R. Biezeno and J. J. Koch, Procs. of the 5th International Congress for Applied Mechanics, 1939, pp. 34-39.)
291	6494	U.S.A.	...	*The Elastic Stability of Tee Stiffeners.* (D. F. Windenburg, Procs. of the 5th International Congress for Applied Mechanics, 1939, pp. 54-61.)

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292	6499	U.S.A. ...	*Elastic Instability of Tubular and Panel-Shaped Cylindrical Shells.* (H. Reissner, Procs. of the 5th International Congress for Applied Mechanics, 1939, pp. 80-87.)
294	6756	Germany ...	*Numerical Evaluation of the Efficiency of an Engineering Structure—Addendum.* (F. Kesselring, Z.V.D.I., Vol. 86, No. 49-50, 12/12/42, pp. 749-752.)
295	6823	U.S.A. ...	*A Numerical Procedure for the Calculation of the Moments in Edge-Reinforcements of Cut-Outs in Monocoques.* (N. J. Hoff, A.S.M.E. Annual Meeting, Dec., 1942, Paper No. 111.)
			Plates.
296	6495	U.S.A. ...	*Deflections and Stress in Built-up Half Diaphragm.* (D. M. Smith, Procs. of the 5th International Congress for Applied Mechanics, 1939, pp. 62-65.)
297	6497	U.S.A. ...	*Thin Plates on Elastic Foundations.* (D. L. Hall, Procs. of the 5th International Congress for Applied Mechanics, 1939, pp. 71-74.)
298	6505	U.S.A. ...	*Uniformly Loaded, Clamped, Rectangular Plates with Large Deflections.* (S. Way, Procs. of the 5th International Congress for Applied Mechanics, 1939, pp. 123-128.)
299	6766	Germany ...	*The Centrally Loaded Thick Circular Plate.* (R. Ohlig, Ing. Archiv., Vol. 13, No. 3, 1942, pp. 155-162.)
300	6770	Germany ...	*Unsymmetrical Bending of a Circular Plate (Stiffness Varying as the Square of the Radius).* (P. O. Olsson, Ing. Archiv., Vol. 13, No. 3, 1942, pp. 147-154.)
			Beams and Columns.
301	6690	U.S.A. ...	*Notes on Some Secondary Stresses in Thin Walled Box Beams.* (E. Reissner, J. Aeron. Sci., Vol. 9, No. 14, Dec., 1942, pp. 538-542.)
302	6118	U.S.A. ...	*Perforated Cover Plates for Steel Columns.* (A. H. Stang, J. Res. Bur. of Stands., Vol. 29, No. 4, Oct., 1942, pp. 279-302.)
303	6243	U.S.A. ...	*Designing Web-Flange Rivet Connections for Shear Stresses (Tension Field Web).* (H. C. Martin, Aero Digest, Vol. 41, No. 4, Oct., 1942, pp. 116-118 and 251.)
304	6262	G.B.	*The Design of Trusses and its Influence on Weight and Stiffness.* (J. Drymael, J. Roy. Aeron. Soc., Vol. 46, No. 384, Dec., 1942, pp. 297-308.)
305	6502	U.S.A. ...	*Buckling of Web Girder Caused by Local Application of Load.* (K. Girkman, Procs. of the 5th International Congress for Applied Mechanics, 1939, pp. 107-111.)

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307	6768	Germany ...	*Elastic Buckling of Straight Rods Under Influence of Their Weight—the Cross Section Varying Experimentally (with Application to the Limiting Height of Forces).* (R. G. Olsson, Ing. Archiv., Vol. 13, No. 3, 1942, pp. 162-174.)
			Kinematics.
308	6188	G.B.	*Mechanical Movements and Their Design.* (Machinery, Vol. 61, No. 1,576, 24/12/42, pp. 712-714.)
309	6490	U.S.A. ...	*Methods of Analogy in Applied Mechanics.* (J. Peres, Procs. of the 5th International Congress for Applied Mechanics, 1939, pp. 9-19.)
310	6550	U.S.A. ...	*A Brief Account of Modern Kinematics.* (A. E. Richard de Jonge, Annual Meeting of the A.S.M.E., Power Division, 30th Nov.-4th Dec., 1942, pp. 1-13.)

Materials, Testing and Working Processes.

Iron and Steel (Production and Constitution).

311	6358	G.B.	*Rotary Furnace for Steel Production.* (Machinery, Vol. 61, No. 1,574, 10/12/42, p. 659.)
312	6519	U.S.A. ...	*The Alpha Iron Lattice Parameter as Affected by Molybdenum, and an Introduction to the Problem of the Partition of Molybdenum in Steel.* (T. E. Bowman and others, 24th Annual Convention of the A.S.M., Paper No. 14, 12-16 Oct., 1942, pp. 1-8.)
313	6520	U.S.A. ...	*The Effect of Molybdenum on the Isothermal Sub-Critical Transformation of Austenite in Eutectoid and Hyper-Eutectoid Steels.* (J. R. Blanchard and others, 24th Annual Convention of the A.S.M., Paper No. 15, 12-16 Oct., 1942, pp. 1-20.)
314	6521	U.S.A. ...	*The Effect of Molybdenum on the Rate of Diffusion of Carbon in Austenite.* (J. L. Hamm and others, 24th Annual Convention of the A.S.M., Paper No. 16, 12-16 Oct., 1942, pp. 1-21.)
315	6525	U.S.A. ...	*A Metallographic Study of the Formation of Austenite from Aggregates of Ferrite and Cementite in an Iron-Carbon Alloy of 0.5 per cent. Carbon.* (T. G. Digges and S. J. Rosenberg, 24th Annual Convention of the A.S.M., Paper No. 29, 12-16 Oct., 1942, pp. 1-22.)
316	6526	U.S.A. ...	*Influence of Initial Structure and Rate of Heating on the Austenitic Grain Size of 0.5 per cent. Carbon Steels and Iron-Carbon Alloy.* (T. S. Digges and S. J. Rosenberg, 24th Annual Convention of the A.S.M., Paper No. 21, 12-16 Oct., 1942, pp. 1-39.)
317	6527	U.S.A. ...	*The Mechanism and the Rate of Formation of Austenite from Ferrite-Cementite Aggregates.* (S. A. Roberts and R. T. Mehl, 24th Annual Convention of the A.S.M., Paper No. 22, 12-16 Oct., 1942, pp. 1-37.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
318	6532	U.S.A. ...	*A Study of the Iron-Pig Iron-Manganese Alloys.* (A. R. Troiano and F. T. McGuire, 24th Annual Convention of the A.S.M., Paper No. 27, 12-16 Oct., 1942, pp. 1-20.)
319	6533	U.S.A. ...	*The Induction Furnace as a High Temperature Calorimites and the Heat of Solution of Silicon in Liquid Iron.* (J. Chipman and N. J. Grant, 24th Annual Convention of the A.S.M., Paper No. 28, 12 and 16 Oct., 1942, pp. 1-73.)
320	6535	U.S.A. ...	*The Kinetics of Austenite Decomposition in High Speed Steel.* (P. Gordon and others, 24th Annual Convention of the A.S.M., Paper No. 30, 12-16 Oct., 1942, pp. 1-37.)
321	6536	U.S.A. ...	*The Tempering of Two High Carbon High Chromium Steels.* (O. Zmeskal and M. Cohen, 24th Annual Convention of the A.S.M., Paper No. 31, 12-16 Oct., 1942, pp. 1-28.)
			Iron and Steel (Machinability and Hardness).
322	6119	U.S.A. ...	*Simultaneous Measurement of Magnetic and Dilalometric Changes (Structural Change During Hardening of Steel).* (O. Zmeskal and M. Cohen, Rev. of Scientific Instrum., Vol. 13, No. 8, Aug., 1942, pp. 346-348.)
323	6130	G.B.	*Flame Hardening with Town Gas.* (R. F. Apter and H. W. Smith, Machinist, Vol. 86, No. 35, 5/12/42, pp. 871-874.)
324	6506	U.S.A. ...	*Effect of Elements in Solid Solution on Hardness and Response to Heat Treatment of Iron Binary Alloys.* (C. R. Austin, 24th Annual Convention of A.S.M., Preprints No. 1, Oct. 12-16, 1942, pp. 1-16.)
325	6507	U.S.A. ...	*Third Element Effects on Hardenability of a Pure Hyper-Eutectoid Iron-Carbon Alloy.* (C. R. Austin and others, 24th Annual Convention of the A.S.M., Preprints, Oct. 19, 1942, No. 2, p. 1-37.
326	6509	U.S.A. ...	*The Effect of Hardness on the Machinability of Six Alloy Steels.* (O. W. Boston and L. V. Colwell, 24th Annual Convention of the A.S.M. (Preprints), No. 4, Oct. 12-16, 1942, pp. 1-16.)
327	6510	U.S.A. ...	*Carburizing Characteristics of 0.20 per cent. Carbon Alloy and Plain Carbon Steels.* (G. K. Manning, 24th Annual Convention of A.S.M. (Preprints), No. 5, Oct. 12-16, 1942, pp. 1-26.
328	6516	U.S.A. ...	*The End-Quench Test, Reproducibility.* (Morse Hill, 24th Annual Convention of the A.S.M. Paper No. 11, 12-16 Oct., 1942, pp. 1-15.)
329	6517	U.S.A. ...	*The End-Quench Test: Hardenability of Aircraft Steels and its Representation.* (Morse Hill, 24th Annual Convention of the A.S.M., Paper No. 12, 12-16 Oct., 1942, pp. 1-15.)
330	6518	U.S.A. ...	*Hardenability Control of a 1 per cent. Carbon Steel.* (G. R. Barrow and G. Sole, 24th Annual Convention of the A.S.M., Paper No. 13, 12-16 Oct., 1942, pp. 1-9.)

ITEM NO.	R.T.P. REF.			TITLE AND JOURNAL.
331	6534	U.S.A.	...	*The Hardening of Tool Steels.* (P. Payson and J. L. Klein, 24th Annual Convention of the A.S.M., Paper No. 29, 12 and 16 Oct., 1942, pp. 1-27.)
332	6537	U.S.A.	...	*Some Aspects of Strain Hardenability of Austenitic Manganese Steel.* (D. Niconoff, 24th Annual Convention of the A.S.M., Paper No. 32, 12-16 Oct., 1942, pp. 1-19.)
333	6539	U.S.A.	...	*The Effect of Moderate Cold Rolling on the Hardness of the Surface Layer of 0.34 per cent. of Carbon Steel Plates.* (H. K. Herschman, 24th Annual Convention of the A.S.M., Paper No. 34, 12-16 Oct., 1942, pp. 1-12.)
334	6613	U.S.A.	...	*Machinability Tests on Six Alloy Steels (Digest).* (O. W. Boston and L. V. Colwell, Autom. Ind., Vol. 87, No. 9, 1/11/42, p. 35.)
335	6794	Germany	...	*Scatter of Brinell Hardness Values for Steel and Cast Iron.* (F. Rolf and W. Eger, Z.V.D.I, Vol. 86, No. 35-36, 5/9/42, pp. 545-549.)
				Iron and Steel (Mechanical Properties).
336	6512	U.S.A.	...	*Bursting Tests on Notched Alloy Steel Tubing.* (G. Sachs and J. D. Lubahn, 24th Annual Convention of the A.S.M., Paper No. 7, 12-16 Oct., 1942, pp. 1-16.)
337	6513	U.S.A.	...	*Notched Bar Tensile Tests on Heat-Treated Low Alloy Steels.* (G. Sachs and J. D. Lubahn, 24th Annual Convention of the A.S.M., Paper No. 8, 12-16 Oct., 1942, pp. 1-33.)
338	6515	U.S.A.	...	*Fatigue Strength of Normalised and Tempered versus As-Forged Full Size Railroad Car Axles.* (O. J. Horger and T. V. Buckwatter, 24th Annual Convention of the A.S.M., Paper No. 10, 12-16 Oct., 1942, pp. 1-17.)
339	6529	U.S.A.	...	*Influence of Strain Rate on Strength and Type of Failure of Carbon-Molybdenum Steel at 850, 1,000 and 1,000 Degrees Fahr.* (R. F. Miller and others, 24th Annual Convention of the A.S.M., Paper No. 24, 12-16 Oct., 1942, pp. 1-29.)
				Cast Iron.
340	6263	G.B.	... ...	*Research in Cast Iron.* (Engineering, Vol. 155, No. 4,018, 15/1/43, p. 45.)
				Al. and Mg. Alloys.
341	6102	G.B.	... ...	*Constitution of Alloys Bibliography (Digest).* (Institute of Metals, Light Metals, Vol. 5, No. 59, Dec., 1942, p. 521.)
342	6103	G.B.	... ...	*Comparative Resilience of Dural and Steel.* (L. P. Dudley, Light Metals, Vol. 5, No. 59, Dec., 1942, pp. 497-500.)
343	6104	G.B.	... ...	*Electrically Heated Salt Baths.* (H. R. Smith, Light Metals, Vol. 5, No. 59, Dec., 1942, pp. 504-510.)

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344	6105	G.B.	*Al. in the Canning Industry.* (Light Metals, Vol. 5, No. 59, Dec., 1942, pp. 526-540.)
345	6112	G.B.	*Mechanical Testing of Al. (Digest).* (Northern Al. Co. Light Metals, Vol. 5, No. 59, Dec., 1942, p. 523.)
346	6373	G.B.	*Extruding Non-Ferrous Metal Tubes.* (Machinery, Vol. 61, No. 1,568, 29/10/42, pp. 492-493.)
347	6375	G.B.	*Speeding Up the Seasoning of Castings.* (Machinery, Vol. 61, No. 1,570, 12/11/42, p. 540.)
348	6437	G.B.	*Quenching of Light Alloys.* (Metal Industry, Vol. 62, No. 4, 22/1/43, p. 52.)
349	6540	U.S.A. ...	*The Metallography of Commercial Magnesium Alloys.* (J. B. Hess and P. F. George, 24th Annual Convention of the A.S.M., Paper No. 33, 12-16 Oct., 1942, pp. 1-22.)
350	6578	G.B.	*Cold Pressing Properties of Dural Type Alloy Sheet (Discussion).* (J. C. Arrowsmith and others, J. Inst. Metals, Vol. 9, No. 12, Dec., 1942, pp. 387-395.)
351	6581	G.B.	*Damping Characteristics of Some Mg. and Al. Alloys Over the Range −50° to 280°C.* (L. R. Stanton and F. C. Thompson, J. Inst. Metals, Vol. 10, No. 1, Jan., 1943, pp. 29-42.)
352	6624	Germany ...	*Deep Drawing for Zn. and Al. Alloys.* (F. Erdmann and H. Hanemann, Metal Industry, Vol. 62, No. 6, 5/2/43, pp. 82-85.)
353	6626	U.S.A. ...	*Heat Treatment of Al. (Bell Aircraft Accelerated Procedure).* (Metal Industry, Vol. 62, No. 6, 5/2/43, p. 88.)
354	6628	G.B.	*The Crystal Process for the Anodic Oxidation of Al.* (A. Ensor, Metal Industry, Vol. 62, No. 6, 5/2/43, pp. 90-92.)
355	6629	G.B.	*Working Stresses in Al. Alloy Structures.* (E. W. Thomas, Engineering, Vol. 155, No. 4,021, 5/2/42, pp. 101.)
356	6683	G.B.	*World Production of Magnesium.* (Imperial Institute, Mineral Resources Dept., Report on Magnesium, 1939, pp. 23-24.)
357	6684	U.S.A. ...	*World Production of Aluminium.* (Metal Statistics, 1939, p. 503.)
			Copper and Copper Alloys.
358	6127	G.B.	*Properties of Commercial Coppers Containing Selenium, Tellurium and Bismuth.* (G. L. Bailey and A. P. Hallowes, Metal Industry, Vol. 62, No. 1, 1/1/42, pp. 6-9.)
359	6215	G.B.	*Properties of Commercial Coppers Containing Se., Te. and Bi.* (G. L. Bailey and A. P. C. Hallowes, Metal Industry, Vol. 62, No. 2, 8/1/43, pp. 18-20.)
360	6266	G.B.	*De-Oxidised Copper for Tube Manufacture (Effect of Se., Te. and Bi.).* (M. Cork and G. Parker, Metal Industry, Vol. 61, No. 26, 25/12/42, pp. 402-405.)

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361	6530	U.S.A.	...	*Rupture Tests at 200 Degrees Cent. on Some Copper Alloys.* (E. R. Parker and C. Ferguson, 24th Annual Convention of the A.S.M., Paper No. 25, 12-16 Oct., 1942, pp. 1-17.)
362	6538	U.S.A.	...	*The Precipitation Reaction in Aged Cold-Rolled 1 per Cent. Cadmium-Copper. Its Effects on Hardness, Conductivity end Tensile Properties.* (R. H. Harrington and L. E. Cole, 24th Annual Convention of the A.S.M., Paper No. 33, 12-16 Oct, 1942, pp. 1-19.)
363	6542	U.S.A.	...	*Effects of Various Solute Elements on the Hardness and Rolling Textures of Copper.* (R. M. Brick and others, 24th Annual Convention of the A.S.M., Paper No. 37, 12-16 Oct., 1942, pp. 1-21.)
				Bearing Metals.
364	6126	G.B.	...	*Bearing Metals and Bearings for Internal Combustion Engines.* (J. W. Donaldson, Metal Industry, Vol. 62, No. 1, 1/1/43, pp. 2-4.)
365	6143	U.S.A.	...	*Friction in Intermittently Loaded Sleeve Bearings.* (R. W. Dayton and others, Mech. Eng., Vol. 64, No. 9, Sept., 1942, pp. 667-668.)
366	6228	G.B.	...	*Bearing Metals and Bearings for I.C. Engines.* (J. W. Donaldson, Metal Industry, Vol. 62, No. 3, 15/1/43, pp. 43-44.)
367	6301	U.S.A.	...	*Cast Iron as Bearing Material, II.* (P. Grodzinski, Machinist, Vol. 86, No. 37, 26/12/42, pp. 234-235 E.)
368	6319	G.B.	...	*Tin Base Bearing Metals Adhesion and Strength.* (Airc. Prod., Vol. 5, No. 51, Jan., 1943, p. 9.)
369	6558	G.B.	...	*Bearing Metals in Steel Mill Practice (Bronzes and Babbitts).* (H. A. White, Metal Industry, Vol. 62, No. 5, 29/1/43, pp. 71-74.)
370	6579	G.B.	...	*Railway Bearing Metals (Discussion).* (H. O'Neill, J. Inst. Metals, Vol. 9, No. 12, Dec., 1942, pp. 397-414.)
				Alloy Constitution.
371	6136	Germany	...	*The Stability of Mixed Crystals in Binary Systems.* (E. Schiel, Z. fur Metalk., Vol. 34, No. 10, Oct., 1942, pp. 242-246.)
372	6300	U.S.A.	...	*Influence of Crystal Size and Orientation upon the Mechanical Properties of Metals in the Cast Condition (Discussion).* (L. Northcott, J. Inst. Metals, Vol. 68, No. 8, Aug., 1942, pp. 281-282.)
373	6508	U.S.A.	...	*The Ar." Range in Some Iron-Cobalt-Tungsten Alloys.* (W. P. Sykes, 24th Annual Convention of the A.S.M. (Preprints), No. 3, Oct. 12-16, 1942, pp. 1-20.)
374	6528	U.S.A.	...	*The Tantalum-Carbon System.* (F. H. Ellinger, 24th Annual Convention of the A.S.M., Paper No. 23, 12-16 Oct., 1942, pp. 1-4.)

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375	6541	U.S.A. ...	*Study of Inverse Segregation Suggests New Method of Making Certain Alloys.* (M. L. Samuels and others, 24th Annual Convention of the A.S.M., Paper No. 36, 12-16 Oct., 1942, pp. 1-24.)
			Plastics.
376	6198	G.B.	*Design of Plastic Mouldings for Economic Mass Production.* (Machinery, Vol. 61, No. 1,572, 26/11/42, pp. 599-603.)
377	6208	U.S.A. ...	*Melamine Resin Treatment Gives High Wet Strength to Paper.* (Sci. Am., Vol. 167, No. 6, Dec., 1942, pp. 280-281.)
378	6234	U.S.A. ...	*Nylon.* (E. K. Bolton, Ind. and Eng. Chem., Vol. 20, No. 21, 10/11/42, pp. 1,365-1,366.)
379	6245	U.S.A. ...	*Lucite (Design Information).* (W. C. Wall, Aero Digest, Vol. 41, No. 4, Oct., 1942, pp. 122-129 and 254.)
380	6275	G.B.	*High Polymers as Colloidal Systems.* B. S. Brajnikoff, Plastics, Vol. 7, No. 68, Jan., 1943, pp. 37-46.)
381	6278	G.B.	*Metal Bonded Plastic (Plastel).* (Trade and Engineering Times, Vol. 52, No. 946, Dec., 1942, p. 44.)
382	6334	G.B.	*Review of Plastic Industry in* 1942. (British Plastics, Vol. 14, No. 164, Jan., 1943, pp. 439-447.)
383	6335	G.B.	*Hydulignum Patents.* (British Plastics, Vol. 14, No. 164, Jan., 1943, p. 447.)
384	6336	G.B.	*Metallurgical Progress and the Plastic Industry (Tools, Moulds, etc.).* (British Plastics, Vol. 14, No. 164, Jan., 1943, pp. 448-452.)
385	6338	G.B.	*The Design of Moulded Plastic Parts.* (British Plastics, Vol. 14, No. 164, Jan., 1943, pp. 456-466 and 477.)
386	6340	U.S.A. ...	*Resistance of Plastic to Chemical Reagents (from the U.S.A.).* G. M. Kline and others, British Plastics, Vol. 14, No. 164, Jan., 1943, pp. 478-487.)
387	6341	U.S.A. ...	*Plastics in Ordnance (from the U.S.A.) (Rifle Stocks, Windshields, Fuses, etc.).* (C. H. S. Tupholme, British Plastics, Vol. 14, No. 164, Jan., 1943, pp. 489-490 and 494.)
388	6342	G.B.	*Plastic Replacement for Kapok.* (British Plastics, Vol. 14, No. 164, Jan., 1943, pp. 491-492.)
389	6343	G.B.	*Amerflex Plastic Tubing for Electric Conduits.* (British Plastics, Vol. 14, No. 164, Jan., 1943, p. 494.)
390	6357	G.B.	*Design of Plastic Mouldings for Mass Production.* (Machinery, Vol. 61, No. 1,574, 10/12/42, pp. 657-659.)
391	6405	G.B.	*Permanoid Plastic (Cellulose Acetate Base).* (Canadian Aviation, Vol. 15, No. 10, Oct., 1942, pp. 118 and 120.)
392	6413	Canada ...	*Cold Setting Resin Adhesives.* (Canadian Aviation, Vol. 15, No. 10, Oct., 1942, p. 86.)

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393	6419	G.B.	...	*Resiltex Shock-Absorbing Material* (*Animal and Vegetable Fibre*). (Engineering, Vol. 155, No. 4,019, 22/1/43, pp. 67-68.)
394	6435	G.B.	...	*Abstracts* (*Plastics*), *Issued by the Controller of Chemical Research*. (Plastic Abstracts No. 40, Dec., 1942.)
395	6555	U.S.A.	...	*Synthetic Ion-Exchange Resins for Removing Salts from Water*. (Ind. and Eng. Chem., Vol. 20, No. 23, 10/12/42, p. 1,588.)
396	6609	U.S.A.	...	*Plastic Production in the U.S.A.* (Trade and Eng. Times, Vol. 52, No. 947, Jan., 1943, p. 44.)
397	6617	U.S.A.	...	*'Bubblfil'' (Aerated Cellophane) Replaces Sponge Rubber*. (Autom. Ind., Vol. 87, No. 9, 1/11/42, p. 72.)
398	6696	U.S.A.	...	*Saran Plastic Pipe and Tubing* (*Can be Welded*). (Ind. and Eng. Chem. (News Ed.), Vol. 20, No. 22, 25/11/42, pp. 1,508-1,510.)
399	6697	U.S.A.	...	*Soya Bean Plastics*. (G. H. Brother, Ind. and Eng. Chem. (News Ed.), Vol. 20, No. 22, 25/11/42, pp. 1,511-1,512.)
400	6699	U.S.A.	...	*Plastic Materials for Resin-Lacquered Food Cans*. (Ind. and Eng. Chem. (News Ed.), Vol. 20, No. 22, 25/11/42, p. 1,522.)
401	6736	Germany	...	*Plastic Aircraft Abroad* (*Review of American Practice*). (G. Richter, Luftwissen, Vol. 9, No. 10, Oct., 1942, pp. 292-294.)
402	6757	Germany	...	*Double Rotor Worm Gear Pump for Mixing Plastic Materials*. (Z.V.D.I., Vol. 86, No. 49-50, 12/12/42, pp. 752-753.)
403	6787	U.S.A.	...	*Physical Properties of Laminated Plastics* (*Panelyte*). (A. M. Lennie and R. W. Barber, Mech. Eng., Vol. 64, No. 12, Dec., 1942, pp. 888-890.)
				Rubber (*Synthetic and Natural*).
404	6231	U.S.A.	...	*Rubber Technology*. (W. C. Geer, Ind. and Eng. Chem., Vol. 20, No. 21, 10/11/42, pp. 1,358-1,360.)
405	6175	G.B.	...	*Electrical Properties of Polythene*. (F. T. Farmer, Nature, Vol. 150, No. 3,809, 31/10/42, p. 521.)
406	6232	U.S.A.	...	*Thiokol* (*Synthetic Rubber*). (B. Longstreth, Ind. and Eng. Chem., Vol. 20, No. 21, 10/11/42, p. 1,362.)
407	6233	U.S.A.	...	*Neoprene* (*Synthetic Rubber*). (Ind. and Eng. Chem., Vol. 20, No. 21, 10/11/42, pp. 1,363-1,364.)
408	6274	G.B.	...	*Chlorinated Rubber as a Surface Protection and Stopping Leakage*. ((Plastics, Vol. 7, No. 68, Jan., 1943, p. 34.)
409	6395	G.B.	...	*Natural and Synthetic Rubber*. (V .L. Gruberg, Flight, Vol. 43, No. 1,776, 7/1/43, pp. 13-18.)
410	6564	U.S.A.	...	*The Rubber Situation in the U.S.A.* (Engineer, Vol. 175, No. 4,542, 29/1/43, p. 91.)
411	6774	U.S.A.	...	*Vibration and Rubber Springs* (*Discussion*). (W. C. Keys, Mech. Eng., Vol. 64, No 11, Nov., 1942, p. 808.)

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412	6775	U.S.A. ...	*Houdry Process for the Manufacture of Butadiene.* (C. H. Thayer and others, Mech. Eng., Vol. 64, No. 11, Nov., 1942, pp. 777-778.)
413	*6790	Germany ...	*The Design of Spring Elements Made of Rubber.* (C. W. Kosten, Z.V.D.I., Vol. 86, No. 35-36, 5/9/42, pp. 535-538.)
			Glass.
414	6205	U.S.A. ...	*Compacted Glass for Precision Optics.* (Sci. Am., Vol. 167, No. 6, Dec., 1942, pp. 252-253.)
415	6212	U.S.A. ...	*Foam Glass as a Substitute for Cork.* (Sci. Am., Vol. 167, No. 6, Dec., 1942, p. 274.)
416	6213	U.S.A. ...	*Glass Fibre on a Wire Mesh Base for Camouflage Netting.* (Sci. Am., Vol. 167, No. 6, Dec., 1942, p. 276.)
			Diamond and Graphite.
417	6351	G.B.	*Diamond Abrasive Wheels for Sintered Metallic Carbides.* (Machinery, Vol. 61, No. 1,571, 19/11/42, pp. 567-570.)
418	6414	Canada ...	*Diamonds in Industry.* (Canadian Aviation, Vol. 15, No. 10, Oct., 1942, p. 86.)
419	6751	Germany ...	*Industrial Graphite.* (Z.V.D.I., Vol. 86, No. 49-50, 12/12/42, pp. 735-736.)
			Wood and Plywood.
420	6141	U.S.A. ...	*Urea Treatment of Lumber (Discussion).* (Mech. Eng., Vol. 64, No. 9, Sept., 1942, pp. 678-680.)
421	6192	G.B.	*Densified Laminated Woods for Jigs and Tools.* (A. E. L. Jervis, Machinery, Vol. 61, No. 1,575, 17/12/42, pp. 673-679.)
422	6271	G.B.	*Plastic Motor Car Body (High Pressure Moulding on Impregnated Plywood).* (D. W. Brown, Plastics, Vol. 7, No. 68, Jan., 1943, pp. 3-8 and 46.)
423	6337	G.B.	*Resin Impregnated Plywood Boat Hulls.* (British Plastics, Vol. 14, No. 164, Jan., 1943, pp. 454-455.)
424	6382	G.B.	*Seasoning of Timber.* (O. L. Howard, Nature, Vol. 150, No. 3,813, 28/11/42, pp. 638-639.)
425	6593	G.B.	*Electrical Resistance of Wood and Moisture Content.* (W. W. Barkas and others, Nature, Vol. 151, No. 3,820, 16/1/43, p. 83.)
426	6669	U.S.A. ...	*Susceptibility of Wood to Decay (Effect of Urea).* (F. H. Kanfert and E. A. Behr, Ind. and Eng. Chem, (Ind. Ed.), Vol. 34, No. 12, Dec., 1942, pp. 1,510-1,515.)
			Welding.
427	6107	U.S.A. ...	*Welding in a Helenium Atmosphere (Digest).* (Light Metals, Vol. 5, No. 59, Dec., 1942, pp. 523-524.)
428	6210	U.S.A. ...	*New Resistance Welding Control "Temp. A. Trol." (Thermocouple Incorporated in Electrode).* (Sci. Am., Vol. 167, No. 6, Dec., 1942, p. 258.)

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429	6221	G.B.	*Propane and Coal Gas in Welding and Metal Cutting.* (Engineering, Vol. 155, No. 4,017, 8/1/43, p. 40.)
430	6238	U.S.A. ...	*Improved Spot Welding with Cooled Electrodes (Ford).* (F. M. Reck, Aero Digest, Vol. 41, No. 4, Oct., 1942, pp. 164-167 and 238-240.)
431	6256	U.S.A. ...	*Heliarc Welding.* (Aero Digest, Vol. 41, No. 4, Oct., 1942, pp. 218, 241-244.)
432	6268	G.B.	*Substitution of Acetylene by Propane or Coal Gas in Welding or Cutting.* (Metal Industry, Vol. 61, No. 26, 25/12/42, p. 408.)
433	6269	G.B.	*Fusion Welding of Magnesium.* (T. E. Piper, Metal Industry, Vol. 61, No. 26, 25/12/42, p. 409.)
434	6317	G.B.	*Spot Welding Light Alloys.* (Airc. Prod., Vol. 5, No. 51, Jan., 1943, pp. 3-5.)
435	6365	G.B.	*Spot Welding Mild Steel.* (Machinery, Vol. 61, No. 1,566, 15/10/42, p. 436.)
436	6418	G.B.	*Fleet-Fillet Welding (Weld Penetrates Beyond Root of Joint).* (Engineering, Vol. 155, No. 4,019, 22/1/43, pp. 66-67.)
437	6420	G.B.	*Propane and Coal Gas in Welding and Metal Cutting.* (E. Christie, Engineering, Vol. 155, No. 4,019, 22/1/43, p. 76.)
438	6585	G.B.	*Electron Tube Control of Resistance Welding Machines.* (B. G. Higgins, Sheet Met. Ind., Vol. 17, No. 190, Feb., 1943, pp. 315-322.)
439	6586	G.B.	*Spot Welding of Aircraft Structures.* (E. S. Jenkins, Sheet Met. Ind., Vol. 17, No. 190, Feb., 1943, pp. 323-324 and 330.)
440	6587	G.B.	*Conservation of Arc Welding Electrodes.* (Sheet Metal Industry, Vol. 17, No. 190, Feb., 1943, pp. 325-330.)
442	6612	U.S.A. ...	*Removal of Broken Tools from Drilled Holes by Welding on Steel Rods.* (H. J. Burnett and C. E. Harding, Autom. Ind., Vol. 87, No. 9, 1/11/42, pp. 30-31, 88-90.)
443	6614	U.S.A. ...	*The Unionmelt Welding Process.* (Autom. Ind., Vol. 87, No. 9, 1/11/42, pp. 36-37, 84-86.)
444	6745	Germany ...	*The Determination of Welding Faults on Highly Stressed Spar Connections.* (G. Bauer, Luftwissen, Vol. 9, No. 12, Dec., 1942, pp. 343-348.)
445	6788	U.S.A. ...	*"Heliarc" Welding.* (Mech. Eng., Vol. 64, No. 12, Dec., 1942, pp. 901-902.)
			Solders.
446	6230	G.B.	*Use of High Lead Solders.* (Metal Industry, Vol. 62, No. 3, 15/1/43, p. 44.)
447	6364	G.B.	*Modern Brazing Materials.* (Machinery, Vol. 61, No. 1,566, 15/10/42, Vol. 61, No. 1,566, pp. 433-436.)
448	6559	G.B.	*Lead-Silver-Iridium Solders.* (Metal Industry, Vol. 62, No. 5, 29/1/43, p. 76.)
449	6591	G.B.	*The Soldering of Aluminium (Hard and Soft).* (O. Einerl and F. Neurath, Elect. Eng., Vol. 15, No. 180, Feb., 1943, p. 388.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
			Powder Metallurgy.
450	6128	G.B.	*Production of High Density Parts by Powder Metallurgy.* (C. Hardy and V. D. Cremer, Metal Industry, Vol. 61, No. 1, 1/1/42, pp. 9-10.)
451	6182	G.B.	*Powdered Metals in Machine Design.* (Machinery, Vol. 61, No. 1,577, 31/12/42, pp. 737-740.)
			Methods of Analysis and Identification.
452	6120	U.S.A. ...	*Multiple Electrode High Voltage Arc for Spectrographic Analysis.* (W. D. Owsley, Rev. of Scientific Instruments, Vol. 13, No. 8, Aug., 1942, pp. 342-345.)
453	6185	G.B.	*Direct Determination of Combined Carbon in "Cast Iron."* (Machinery, Vol. 61, No. 1,577, 31/12/42, p. 743.)
454	6445	U.S.A. ...	*Polarographic Determination of Lead in Lead-Bearing Steels.* (G. Hain and W. Barnes, Ind. and Eng. Chem. (Anal. Ed.), Vol. 14, No. 11, 15/11/42, p. 867.)
455	6447	U.S.A. ...	*Spectrophotometric Determination of Iron.* (J. P. Mehlig and H. R. Hullett, Ind. and Eng. Chem. (Anal. Ed.), Vol. 14, No. 11, 15/11/42, pp. 869-871.)
456	6449	U.S.A. ...	*Systematic Identification of the Common Metallic Coatings.* (H. Nechamkin and A. Sanders, Ind. and Eng. Chem. (Anal. Ed.), Vol. 14, No. 11, 15/11/42, pp. 913-914.)
457	6700	U.S.A. ...	*Foam Test for Pure Mercury.* (O. H. Muller, Ind. and Eng. Chem. (News Ed.), Vol. 20, No. 22, 25/11/42, p. 1,528.)
			Grinding, Lapping and Super Finish.
458	6181	G.B.	*Grinding Bakelite Strip Material.* (Machinery, Vol. 61, No. 1,577, 31/12/42, pp. 734-735.)
459	6189	G.B.	*Grinding, Polishing and Buffing of Monel, Nickel and Inconel.* (Machinery, Vol. 61, No. 1,576, 24/12/42, pp. 716-718.)
460	6193	G.B.	*Thread Grinding with Electrical Control.* (L. M. Davis, Machinery, Vol. 61, No. 1,575, 17/12/42, pp. 681-684.)
461	6240	U.S.A. ...	*Special Shapes of Coated Abrasives Speed Production.* (Aero. Digest, Vol. 41, No. 4, Oct., 1942, pp. 170, 176-178 and 254.)
462	6249	U.S.A. ...	*Wrights' Precision Tool Grinding Process.* (Aero. Digest, Vol. 41, No. 4, Oct., 1942, pp. 134 and 244.)
463	6327	G.B.	*Thread Grinding.* (Airc. Prod., Vol. 5, No. 51, Jan., 1943, pp. 48-49.)
464	6367	U.S.A. ...	*Ohio Units Super-Finishing Machine.* (Machinery, Vol. 61, No. 1,566, 15/10/42, p. 444.)
465	6370	G.B.	*Grinding and Lapping of Gauges.* (Machinery, Vol. 61, No. 1,565, 8/10/42, pp. 408-411.)
466	6379	G.B.	*Coolants for Grinding Wheels.* (*R.T.P. Trans.* 1,643.) (*Z.V.D.I.*, 86, 1942, *p.* 198.) (Machinery, Vol. 61, No. 1,573, 3/12/42, pp. 635-636.)

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				Drawing.
467	6108	G.B.	...	*The Drawability of Metals, with Special Reference to the Wedge Test.* (Light Metals, Vol. 5, No. 59, Dec., 1942, pp. 514-520.)
468	6514	U.S.A.	...	*Stress-Strain Measurements in the Drawing of Cylindrical Caps.* (E. L. Bartholomew, 24th Annual Convention of the A.S.M., Paper No. 9, 12-16 Oct., 1942, pp. 1-12.)
				Surface Coatings.
469	6216	Germany	...	*Electro-Polishing of Al. Alloys.* (Metal Industry, Vol. 62, No. 2, 8/1/43, p. 20.)
470	6227	G.B.	...	*Tin Coatings on Copper Wires (Determination of Thickness by an Electrolytic Method).* (P. W. Seddon, Metal Industry, Vol. 62, No. 3, 15/1/43, pp. 37-38.)
471	6440	G.B.	...	*Westinghouse Selinium Compound Rectifiers for Electroplating.* (Metal Industry, Vol. 62, No. 4, 22/1/42, pp. 55-56.)
472	6446	U.S.A.	...	*Measurement of Thickness of Fired-on Gold Coatings (Chemical Solution).* (K. H. Ballard, Ind. and Eng. Chem. (Anal. Ed.), Vol. 14, No. 11, 15/11/42, pp. 868-869.)
473	6576	G.B.	...	*Electroplating on Non-Conducting Materials (Graphite Film).* (Mech. World, Vol. 113, No. 2,925, 22/1/43, p. 98.)
474	6583	G.B.	...	*Zinc Coatings—Method of Testing.* (Sheet Met. Ind., Vol. 17, No. 190, Feb., 1943, pp. 243-248 and 252.)
475	6761	U.S.A.	...	*Thickness of Al. Oxide Coatings (Voltage Required to Puncture Film).* (Nature, Vol. 150, No. 3,806, 10/10/42, p. 428.)
				Dies, Extrusions and Stampings.
476	6109	U.S.A.	...	*Aeroplane Parts by Impact Extrusion (Digest) (Consolidated Aircraft Corp.).* (Light Metals, Metals, Vol. 5, No. 59, Dec., 1942, p. 523.)
477	6284	U.S.A.	...	*Forming Extrusions by Machine Methods.* (C. Coe, Aviation, Vol. 41, No. 9, Sept., 1942, pp. 108-111, 298.)
478	6318	G.B.	...	*Drop Stamping (Compound Curvature).* (Airc. Production, Vol. 5, No. 51, Jan., 1943, pp. 6-9.)
479	6372	G.B.	...	*Zinc Base Alloy Dies for Plastic Mouldings.* (Machinery, Vol. 61, No. 1,568, 29/10/42, pp. 477-480.)
480	6627	G.B.	...	*Dies for the Fabrication of Porous Bearings (Briquetting).* (Metal Industry, Vol. 62, No. 6, 5/2/43, p. 89.)
				Metal Foils.
481	6183	G.B.	...	*Mechanical Properties of Metal Foils.* (Machinery, Vol. 61, No. 1,577, 31/12/42, p. 740.)
482	6582	G.B.	...	*Mechanical Properties of Metal Foils (Discussion).* (B. Chalmers and P. W. Seddons, J. Inst. Metals, Vol. 10, No. 1, Jan., 1943, pp. 43-45.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
			Corrosion.
483	6110	G.B.	*Corrosion of Magnesium Alloys (Digest).* (Light Metals, Vol. 5, No.59, Dec., 1942, p. 524.)
484	6531	U.S.A. ...	*Corrosion of Water Pipes in a Steel Mill.* (C. L. Clark and W. J. Rungester, 24th Annual Convention of the A.S.M., Paper No. 26, 12-16 Oct., 1942, pp. 1-11.)
485	6547	U.S.A. ...	*Corrosion of Unstressed Specimens of Alloy Steel by Steam at Temperatures up to* 1,800°F. (G. A. Hawkins and others, Annual Meeting of the A.S.M.E., Power Division, 30th Nov., 1942, pp. 1-7.)
486	6664	U.S.A. ...	*Corrosion of Metals and Alloys by Flue Gases.* (L. Shmedman and J. S. Yeaw, Ind. and Eng. Chem. (Ind. Ed.), Vol. 34, No. 12, Dec., 1942, pp. 1,436-1,444.)
487	6716	U.S.A. ...	*Protecting Magnesium Against Corrosion.* (W. G. Harvey, Aero Digest, Vol. 41, No. 5, Nov., 1942, pp. 233, 273-276.)
488	6752	Germany ...	*Standardisation of Corrosion Tests in the Pressure Bomb.* (Z.V.D.I., Vol. 86, No. 49-50, 12/12/42, p. 758.)
			Diffusion of Metals.
489	6106	Germany ...	*Micro Hardness Study of Diffusion Process.* (Light Metals, Vol. 5, No. 59, Dec., 1942, pp. 510-513.)
490	6522	U.S.A. ...	*The Method of Thin Films for the Study of Intermetallic Diffusion and Chemical Reactions at Metallic Surfaces.* (H. S. Coleman and H. L. Yeagley, 24th Annual Convention of the A.S.M., Paper 17, 12-16 Oct., 1942, pp. 1-17.)
			Testing Appliances.
491	6180	G.B.	*Auto-Collimator Test for Flatness.* (W. A. Tuplin. Machinery, Vol. 61, No. 1,577, 31/12/42, pp. 729-734.)
492	6184	G.B.	*Avery Pulsator Fatigue Testing Machine.* (Machinery, Vol. 61, No. 1,577, 31/12/42, pp. 742-743.)
493	6190	U.S.A. ...	*Electronic Device for Measuring Creep (G.E.C. of U.S.A.).* (Machinery, Vol. 61, No. 1,577, 24/12/42, p. 718.)
494	6260	U.S.A. ...	*Optical Wear Gauge (Diminution of Base of Conical Indentation).* (Aero Digest, Vol. 41, No. 4, Oct., 1942, pp. 299-300.)
495	6441	G.B.	*Rapid Hand-Operated Hardness Tester for Light Alloys (Webster).* (Metal Industry, Vol. 62, No. 4, 22/1/42, p. 56.)
496	6511	U.S.A. ...	*The Metallography of Galvanised Sheet Steel Using a Specially Prepared Polishing Medium with Controlled P.H.* (D. H. Rowland and O. E. Romeg, 24th Annual Convention of the A.S.M., Paper No. 6, 12-16 Oct., 1942, pp. 1-11.)
497	6553	U.S.A. ...	*Wear Testing of Carpets.* (H. F. Schiefer, J. Res. Bur. Stands., Vol. 29, No. 5, Nov., 1942, pp. 333-379.)

ITEM NO.	R.T.P REF.		TITLE AND JOURNAL.
498	6556	G.B.	*Methods of Recording Macro-Structures (Cellophane Ink Prints).* (G. A. Cottell, Engineering, Vol. 155, No. 4,020, 29/1/43, pp. 81-83.)
499	6577	G.B.	*Apparatus for Carrying Out Bend Tests on Metal Sheet Strips.* (G. H. Glayshaw, J. Inst. Metals, Vol. 9, No. 12, Dec., 1942, pp. 383-385.)
500	6588	G.B.	*Cathode Ray Oscillograph in Polarography.* (T. S. G. Jones, Elect. Eng., Vol. 15, No. 180, Feb., 1943, pp. 367-371.)
501	6729	Germany ...	*Two New Dynamic Extensometers.* (R. Schmidt and H. Klein, Luftwissen, Vol. 9, No. 11, Nov., 1942, pp. 313-316.)
			Flaw Detection.
502	6129	U.S.A. ...	*Inspection of Flaws by Sodium Light (Max. Sensitivity of Light).* (Metal Industry, Vol. 62, No. 1, 1/1/43, p. 10.)
503	6199	G.B.	*Formation of Hairline Cracks.* (Machinery, Vol. 61, No. 1,572, 26/11/42, p. 604.)
504	6211	U.S.A. ...	*Flaw Detection by Sodium Light.* (Sci. Am., Vol. 167, No. 6, Dec., 1942, p. 288.)
505	6415	Canada ...	*Sodium Light for Surface Inspection.* (Canadian Aviation, Vol. 15, No. 10, Oct., 1942, p. 88.)
506	6523	U.S.A. ...	*On the Location of Flaws by Stereo-Radiography.* (J. Rigby, 24th Annual Convention of the A.S.M., Paper 18, 12-16 Oct., 1942, pp. 1-10.)
507	6524	U.S.A. ...	*The Fluorescent Penetrant Method of Detecting Discontinuities.* (T. de Forest, 24th Annual Convention of the A.S.M., Paper No. 19, 12-16 Oct., 1942, pp. 1-10.)
			Electron Microscope.
508	6134	Germany ...	*The Structure of Al_2O_3 Films in Surface Structure Investigations by the Contact Point Process (Electron Microscope).* (E. Semmler, Z. fur Metalk., Vol. 34, No. 10, Oct., 1942, pp. 229/231.)
509	6135	Germany ...	*Surface Structure Investigations of Al. Alloys with the Electron Microscope.* (H. Mahl and F. Pawick, Z. fur Metalk., Vol. 34, No. 10, Oct., 1942, pp. 232-235.)
510	6137	Germany ...	*Comparison Between Optical and Electron Microscope Records (Proof of Identity Between Contact Point and Original Surface for Hydronalium).* (M. v. Ardenne and H. Kirchner, Z. fur Metalk., Vol. 34, No. 10, Oct., 1942, pp. 236-237.)
511	6589	G.B.	*Electron Optics (III).* (D. Gabor, Elect. Eng., Vol. 15, No. 180, Feb., 1943, pp. 372-374.)
512	6663	U.S.A. ...	*Electron Microscope (Calibration and Use).* (C. J. Burton and others, Ind. and Eng. Chem. (Ind. Ed.), Vol. 34, No. 12, Dec., 1942, pp. 1,429-1,436.)
			X-Ray Examination.
513	6194	G.B.	*Million Volt X-Ray Tube for Examining Large Castings (Photograph).* (Machinery, Vol. 61, No. 1,575, 17/12/42, p. 697.)

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514	6226	G.B.	...	*Screening Equipment for X-Ray Examination of Light Alloy Castings.* (R. S. M. Payne, Metal Industry, Vol. 62, No. 3, 15/1/43, pp. 34-36.)
515	6265	G.B.	...	*Kodak School of Engineering Radiography.* (Engineer, Vol. 175, No. 4,540, 15/1/43, p. 51.)
516	6295	U.S.A.	...	*Portable X-Ray Outfit for Field Maintenance.* (Aviation, Vol. 41, No. 9, Sept., 1942, p. 210.)
517	6580	G.B.	...	*Determination of Equilibrium Diagrams by X-Ray Method (Review of Four Papers, with Discussion).* (H. Lipson, J. Inst. Metals, Vol. 10, No. 1, Jan., 1943, pp. 1-27.)
518	6622	G.B.	...	*Industrial X-Ray Unit.* (Engineer, Vol. 175, No. 4,543, 5/2/43, p. 118.)
519	6800	Germany	...	*Rapid Determination of Magnesium Content of an Al. Mg. Alloy by X-Ray Diffraction (20 mins.).* (H. Kustner, Z.V.D.I., Vol. 86, No. 35-36, 5/9/42, p. 558.)
				Instruments.
520	6121	U.S.A.	...	*Instrument for Measuring Electrical Field Strength in Strong High Frequency Fields.* (K. S. Lion, Rev. of Scientific Instruments, Vol. 13, No. 8, Aug., 1942, pp. 338-341.)
521	6416	Canada	...	*Aircraft Instruments Manufactured in Canada.* (R. E. Crawford, Canadian Aviation, Vol. 15, No. 10, Oct., 1942, pp. 92-94.)
522	6451	U.S.A.	...	*Automatic Radio Compass.* (W. L. Webb and G. O. Essex, J. Aeron. Sci. (Rev. Sect.), Vol. 1, No. 8, Nov., 1942, pp. 23-38.)
523	6738	Germany	...	*Elastic Mounting of Instruments (Rubber Metal Bonding).* (W. Hollstein, Luftwissen, Vol. 9, No. 10, Oct., 1942, pp. 294-297.)
524	6740	Germany	...	*The Effect of Rotary Motion on the Readings of Statically Balanced Measuring Instruments.* (E. Schmid, Luftwissen, Vol. 9, No. 10, Oct., 1942, pp. 297-299.)
525	6773	U.S.A.	...	*Sound Room for Testing Quietness of Operation of Electric Motors (Units Pass on Conveyor Line).* (A. L. Atherton, Mech. Eng., Vol. 64, No. 11, Nov., 1942, pp. 799-801.)
526	*6798	Germany	...	*Determination of the Friction Couple of Bodies Rotating at High Speeds (with Special Reference to Gyroscopes) (Digest).* (F. Gottwald, Z.V.D.I., Vol. 86, No. 35-36, 5/9/42, pp. 552-553.)
				Navigation.
527	6239	U.S.A.	...	*The Stars in October.* (W. C. Youngclaus, Aero Digest, Vol. 41, No. 4, Oct., 1942, pp. 104 and 381.)
528	6248	U.S.A.	...	*Universal Plotting Sheets for Navigation.* (Aero Digest, Vol. 41, No. 4, Oct., 1942, p. 190.)
529	6408	Canada	...	*Astral Navigation.* (J. W. Melson, Canadian Aviation, Vol. 15, No. 10, Oct., 1942, pp. 51-55 and 61-63.)
530	6719	U.S.A.	...	*The Stars this November.* (W. C. Youngclaus, Aero Digest, Vol. 41, No. 5, Nov., 1942, pp. 295-296, 396.)

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531	6734	Germany ...	*Aircraft Compass and Radio Adjustment on the Ground.* (Luftwissen, Vol. 9, No. 10, pp. 290-291, Oct., 1942.)

Production.

Methods Applied to Named Types.

532	6131	U.S.A. ...	*Production of North American "Mustang."* (G. Stools, Machinist, Vol. 86, No. 35, 5/12/42, p. 884 a.)
533	6187	U.S.A. ...	*Production of Curtiss Wright P. 40 Aircraft.* (Machinery, Vol. 61, No. 1,576, 24/12/42, pp. 701-705.)
534	6197	G.B.	*Merlin Production (Crankshafts and Camshafts).* (Machinery, Vol. 61, No. 1,572, 26/11/42, pp. 589-596.)
535	6207	U.S.A. ...	*Electric Skin Heater Avoids Wrinkling of Aircraft Wing Cover during Riveting.* (Sci. Am., Vol. 167, No. 6, Dec., 1942, p. 253.)
536	6237	U.S.A. ...	*Curtiss Wright Production (Sub-Contracting).* (J. F. Reinhart, Aero Digest, Vol. 41, No. 4, Oct., 1942, pp. 98-103.)
537	6247	U.S.A. ...	*Degreasing Equipment of Curtiss Wright.* (Aero Digest, Vol. 41, No. 4, Oct,, 1942, pp. 131-132.)
538	6254	U.S.A. ...	*Safe Shipment of Aircraft Surfaces.* (Aero Digest, Vol. 41, No. 4, Oct., 1942, pp. 204 and 252.)
539	6320	G.B.	*Avro Lancaster Production.* (W. E. Goff, Airc. Prod., Vol. 5, No. 51, Jan., 1943, p. 10.)
540	6322	G.B.	*Machining Hispano Cannon Components.* (Airc. Prod., Vol. 5, No. 51, Jan., 1943, pp. 25-29.)
541	6323	U.S.A. ...	*Hamilton Airscrew Spray-Painting Conveyor.* (Airc. Prod., Vol. 5, No. 51, Jan., 1943, p. 29.)
542	6324	Germany ...	*Junkers Line Assembly Methods.* (Airc. Prod., Vol. 5, No. 51, Jan., 1943, pp. 31-34.)
543	6326	U.S.A. ...	*Mass Production of American Gliders.* (Airc. Prod., Vol. 5, No. 51, Jan., 1943, pp. 37-40.)
544	6349	G.B.	*Merlin Production (Machining Crankcase).* (Machinery, Vol. 61, No. 1,571, 19/11/42, pp. 531-535.)
	6353	G.B.	*Developments in Airscrew Manufacture (Rotol).* (Machinery, Vol. 61, No. 1,571, 19/11/42, p. 572.)
545	6355	G.B.	*Merlin Production (Pistons).* (Machinery, Vol. 61, No. 1,574, 10/12/42, pp. 645-649.)
546	6359	G.B.	*Line Production of the Merlin Engine.* (Machinery, Vol. 61, No. 1,567, 22/10/42, pp. 449-456.)
547	6360	U.S.A. ...	*Production of Heavy Bomber Parts (Liberator and Catalina).* (Machinery, Vol. 61, No. 1,567, 22/10/42, pp. 459-464.)
548	6363	U.S.A. ...	*Production of Flying Fortresses by the Boeing Aircraft Co.* (Machinery, Vol. 61, No. 1,566, 15/10/42, pp. 421-425.)
549	6368	G.B.	*Production of Ammunition for Aircraft Cannon.* (Machinery, Vol. 61, 8/10/42, No. 1,565, pp. 393-399.)

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550	6369	U.S.A. ...	*Manufacturing Methods at the New Douglas Airplane Works.* (Machinery, Vol. 61, No. 1,565, 8/10/42, pp. 404-406.)
551	6374	G.B.	*Merlin Production—Machining Cylinder Blocks.* (Machinery, Vol. 61, No. 1,570, 12/11/42, pp. 533-538.)
552	6376	G.B.	*Ford Method in Rolls Royce Merlin Production (Inlet and Exhaust Valves).* (Machinery, Vol. 61, No. 1,569, 5/11/42, pp. 505-510.)
553	6377	G.B.	*Merlin Production (Connecting Rods).* (Machinery, Vol. 61, No. 1,573, 3/12/42, pp. 617-623.)
554	6709	U.S.A. ...	*5,000 Ton Press for Production of Airacobras.* (Aero Digest, Vol. 41, No. 5, Nov., 1942, p. 192.)
555	6762	G.B.	*New Metals and New Methods.* (C. H. Desch, Nature, Vol. 150, No. 3,806, 10/10/42, pp. 419-421.)
556	6789	U.S.A. ...	*Airplane Skin Heaters for Wrinkle-Free Wing Covering.* (Mech. Eng., Vol. 64, No. 12, Dec., 1942, p. 903.)
			Gears.
557	6178	G.B.	*Gear Tooth Profile, I.* (C. G. Pfeffe, Machinist, Vol. 86, No. 38, 2/1/42, pp. 240-242 E.)
558	6356	G.B.	*Gear Shaping and Shaper Cutters.* (C. R. Staub, Machinery, Vol. 61, No. 1,574, 10/12/42, pp. 651-655.)
559	6566	G.B.	*The Production of High Speed Helical Gears.* (S. A. Couling, Engineer, Vol. 175, No. 4,542, 29/1/43, pp. 9-100 and 88-90 Discussion.)
560	6623	G.B.	*Production of High Speed Helical Gears.* (S. A. Couling, Engineer, Vol. 175, No. 4,543, 5/2/42, pp. 119-120.)
561	6634	G.B.	*Production of High Speed Helical Gears, with Special Reference to Elimination of Noise (Discussion).* (S. A. Couling, Engineering, Vol. 155, No. 4,021, 5/2/43, pp. 113-115.)
562	6728	Germany ...	*Increasing the Fatigue Strength of Gear Wheels by Design, Hardness and Machining of the Base of the Tooth.* (M. Ulrich, Luftwissen, Vol. 9, No. 11, Nov., 1942, pp. 311-313.)
			Jigs and Tools.
563	6133	G.B.	*Conservation of War Materials, with Special Reference to Tools.* (Machine Tool Review, Vol. 30, No. 18, pp. 34-36.)
564	6191	G.B.	*Recommended Tool Angles for Carbide Tools.* (Machinery, Vol. 61, No. 1,576, 24/12/42, p. 719.)
565	6298	G.B.	*Magnetic Filter for Machine Tool Lubricants.* (Electrical Review, Vol. CXXXI, No. 3,388, 30/10/42, p. 564.)
566	6339	G.B.	*Alternative Methods and Materials for Tool Construction.* (J. Hofton, British Plastics, Vol. 14, No. 164, Jan., 1943, pp. 473-477.)

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567	6361	U.S.A. ...	*Reclaiming High Speed Steel Tools (Suttonizing Process).* (Machinery, Vol. 61, No. 1,567, 22/10/42, p. 466.)
568	6371	G.B.	*Automatic Electrical Control of Machine Tools.* (Machinery, Vol. 61, No. 1,565, 9/10/42, pp. 400-403.)
569	6565	G.B.	*Jigs of Fusible Alloy for Small Quantity Production.* (T. Baldwin and B. Swindells, Engineer, Vol. 175, No. 4,542, 29/1/42, p. 98.)
570	6653	Germany ...	*Jigs for Testing Castings Prior to Final Machining.* (Der deutsche Sportflieger, Vol. 9, No. 12, Dec., 1942, pp. 258.)
571	6683	G.B.	*Double-Ended Broaching Machines.* (Engineering, Vol. 155, No. 4,021, 5/2/43, pp. 106-107.)
572	6750	Germany ...	*Increased Production by Proper Tooling.* (H. Schaumann, Z.V.D.I., Vol. 86, No. 49-50, 12/12/42, pp. 729-735.)
573	6753	Germany ...	*Hydraulic Gearing for Machine Tools.* (H. Krug, Z.V.D.I., Vol. 86, No. 49-50, 12/12/42, pp. 739-748.)
574	6786	U.S.A. ...	*Drilling Deep Holes in Al. Alloys.* (W. W. Gilbert, Mech. Eng., Vol. 64, No. 12, Dec., 1942, pp. 877-887.)
575	6801	Germany ...	*Band Filing as an Alternative to Planing and Shaping Machines (Adv.).* (E. Grob, J.V.D.I., Vol. 86, No. 35-36, 5/9/42, p. 38.)
			Quality, Control, Standardisation and Inspection.
576	6111	G.B.	*Inspection and Rectification of Light Alloy Pressure Castings (Determination of Pressure Tightness).* (Light Metals, Vol. 5, No. 59, Dec., 1942, pp. 520-522.)
577	6140	U.S.A. ...	*Statistical Quality Control (Discussion).* (Mech. Eng., Vol. 64, No. 9, Sept., 1942, p. 678.)
578	6142	U.S.A. ...	*Quality Control in Ordnance Inspection.* (G. D. Edwards, Mech. Eng., Vol. 64, No. 9, Sept., 1942, pp. 673-675.)
579	6393	G.B.	*International Systems and Standards.* (R. Gregory, Nature, Vol. 150, No. 3,813, 28/11/42, pp. 620-622.)
580	6421	G.B.	*Wartime Standardisation.* (C. Le Maistre, Engineering, Vol. 155, No. 4,019, 22/1/43, pp. 76-77.)
581	6575	G.B.	*Wartime Standardisation.* (C. C. Maistre, Mech. World, Vol. 113, No. 2,925, 22/1/43, pp. 96-98.)
582	6635	G.B.	*Wartime Standardisation.* (C. Le Maistre, Engineering, Vol. 155, No. 4,021, 5/2/43, pp. 117-118.)
583	6730	Germany ...	*German Standard Specifications (D.I.N.) Over the Last 25 Years.* (Luftwissen, Vol. 9, No. 11, Nov., 1942, pp. 316-317.)
584	6797	Germany ...	*New Application of Statistics to Engineering Production.* (K. Daeves, Z.V.D.I., Vol. 86, No. 35-36, 5/9/42, p. 556.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
			Lofting, Templates and Blue Prints.
585	6200	G.B. ...	... *Blue Print Delivery by Compressed Air in Douglas Plants.* (Machinery, Vol. 61, No. 1,572, 26/11/42, p. 612.)
586	6259	U.S.A.	... *Producing Templates by a New Process (Sensitized Metal Plate).* (Aero Digest, Vol. 41, No. 4, Oct., 1942, pp. 217 and 252.)
587	6288	U.S.A.	... *Northrops Engineering-Loft. Technique.* (F. M. Gilian, Aviation, Vol. 41, No. 9, Sept., 1942, p. 124.)
588	6307	G.B. ...	... *Preparation of Perspective Diagrams.* (G. D. Hobson, Nature, Vol. 149, No. 3,773, 21/2/42, pp. 209-213.)
589	6682	G.B. ...	... *Bibliography of Published Information on Lofting and Associated Problems*: 1, *Lofting Problems*; 2, *Template Production*; 3, *Photo Templates*; 4, *Template Production by Electrolytic Transfer*; 5, *Drawings (Equipment, etc.).* (R.T.P. Bibliography No. 80, Feb., 1943, Ministry of Aircraft Production.)
590	*6772	U.S.A.	... *Photographic Templates.* (E. C. Jewett and C. D. Tate, Mech. Eng., Vol. 64, No. 11, Nov., 1942, pp. 787-792.)
591	6828	Germany	... *Etching Tool for Marking Edges of Steel Templates (Wear Control).* (Flugsport, Vol. 35, No. 2, 20/1/43, p. 18.)
			Infra-Red Heating.
592	6100	G.B. ...	... *Anodized Al. Reflectors for Infra Red Heating Plant.* (Light Metals, Vol. 5, No. 59, Dec., 1942, pp. 492-496.)
593	6350	G.B. ...	... *Uses of Infra Red Rays (Paint Drying and Shrink Fitting).* (Machinery, Vol. 61, No. 1,571, 19/11/42, p. 566.)
594	6362	U.S.A.	... *Infra Red Heat for Shrinkage Fits.* (Machinery, Vol. 61, No. 1,567, 22/10/42, p. 472.)
			Industrial Training and Research.
595	6179	G.B. ...	... *Teaching Aids for Inspectors.* (C. B. Stanton, Machinist, Vol. 86, No. 38, 2/1/43, pp. 1,015-1,017.)
596	6264	G.B. ...	... *Training for Administration.* (Engineering, Vol. 155, No. 4,018, 15/1/43, p. 52.)
597	6620	G.B. ...	... *Industrial Research in Great Britain.* (P. Dunsheath, Engineer, Vol. 175, No. 4,543, 5/2/43, pp. 106-109 and 112.)
598	6737	Germany	... *Research Organisation in G.B. and the U.S.A.* (Luftwissen, Vol. 9, No. 10, Oct., 1942, p. 305.)
599	6782	U.S.A.	... *Training Women for Jobs in Engineering.* (R. H. Baker and M. L. Reinold, Mech. Eng., Vol. 64, No. 12, Dec., 1942, pp. 853-855.)
600	6783	U.S.A.	... *Women in Engineering.* (L. M. Gilbrath, Mech. Eng., Vol. 64, No. 12, Dec., 1942, pp. 856-857, 859.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
601	6784	U.S.A. ...	*Women in Shops (Montreal Locomotive Works).* (L. L. Park, Mech. Eng., Vol. 64, No. 12, Dec., 1942, pp. 858-859.)
			Welfare and Factory Layout.
602	6177	G.B. ...	... *Mixed Light and Machine Colour Combinations (Shop Illumination).* (Mech. World, Vol. 112, No. 2,920, 1/1/43, pp. 6-7.)
603	6309	G.B. ...	... *Electrical Installation Problems in War Factories (Discussion).* (J. Inst. Elect. Engs., Vol. 89, Pt. II, No. 12 and Index, Dec., 1942, pp. 521-527.)
604	6310	G.B. ...	... *Wartime Maintenance of Electrical Installation and Equipment (Discussion).* (J. Inst. Elect. Engs., Vol. 89, Pt. II, No. 12 and Index, Dec., 1942, pp. 528-532.)
605	6352	G.B. ...	... *Danger in the Misuse of Air Hose (Cleaning Workers Clothes).* (Machinery, Vol. 61, No. 1,571, 19/11/42, p. 570.)
606	6366	G.B. ...	... *Maintenance of Oil-filled Hydraulic Systems Employed in the Factory.* (Machinery, Vol. 61, No. 1,566, 15/10/42, pp. 438-439.)
607	6442	G.B. ...	... *Black-out Ventilation.* (Metal Industry, Vol. 62, No. 4, 22/1/42, p. 56.)
608	6471	G.B. ...	... *Protection of Skin from Cleaning Compounds (J. American Med. Ass., Vol. 6, No. 10, Sept. 6th, 1941, p. 903).* (Bull. of War Med., Vol. 2, No. 4, March, 1942, pp. 328-329.)
609	6472	G.B. ...	... *Welfare Work Outside the Factory. (Min. of Lab. and National Service, CmD. 6,310, 15 pp. 1941, H.M. Stat. O. (3d.).)* (Bull. of War Med., Vol. 2, No. 4, March, 1942, p. 329.)
610	6479	G.B. ...	... *Skin Hazards in Airplane Manufacture. (Pub. Health Rep., Wash., Vol. 56, No. 32, Aug. 8th, 1941, pp. 1,581-1,593.)* (L. Schwartz and J. P. Russell, Bull. of War Med., Vol. 2, No. 3, Jan., 1942, p. 239.)
611	6483	G.B. ...	... *Industrial Lighting for War Conditions. (Trans., Illuminating Eng. Soc., Vol. 6, No. 4, 1941, pp. 49-59.)* (R. Maxted, Bull. of War Med., Vol. 2, No. 2, Nov., 1941, p. 147.)
612	6488	G.B. ...	... *Principles of Factory Ventilation and Heating. Their Applications in Wartime. (Occupational Psychology, Vol. 15, No. 2, April, 1941, pp. 77-78.)* (T. Bedford, Bull. of War Med., Vol. 2, No. 1, Sept, 1941, p. 62.)
613	6584	G.B. ...	... *Colour Contrasts in the Factory Speed Production.* (Sheet Met. Ind., Vol. 17, No. 190, Feb., 1943, pp. 311-312.)
			Scrap.
614	6201	G.B. ...	... *Scrap Disposal.* (Machinery, Vol. 61, No. 1,572, 26/11/42, p. 597.)
615	6229	G.B. ...	... *Magnetic Separation of Scrap.* (H. H. Thompson, Metal Industry, Vol. 62, No. 3, 15/1/43, p. 44.)

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616	6267	G.B. ...	... *Al. Alloy Scrap (Melting and Refining).* (E. Fener, Metal Industry, Vol. 61, No. 26, 25/12/42, pp. 406-408.)
617	6270	G.B. ...	... *Salvage of Al. and Mg. Castings.* (Metal Industry, Vol. 61, No. 26, 25/12/42, p. 409.)
618	6625	G.B. ...	... *Magnetic Separation of Non-Ferrous Scrap.* (Metal Industry, Vol. 62, No. 6, 5/2/43, pp. 87-88.)
			Miscellaneous Problems.
619	6132	U.S.A.	... *Design of Threaded Parts for Production.* (Machine Tool Review, Vol. 30, No. 18, April-July, 1942, p. 64.)
620	6209	U.S.A.	... *Industrial Use of Ammonia.* (Sci. Am., Vol. 167, No. 6, Dec., 1942, p. 255.)
621	6236	U.S.A.	... *Conveyor Belt with Steel Wire Foundation (Photo).* (Ind. and Eng. Chem., Vol. 20, 10/11/42, p. 1,392.)
622	6548	U.S.A.	... *Practical Aspects of Making Expanded Joints.* (C. A. Maxwell, Annual Meeting of the A.S.M.E., Power Division, 30 Nov. - 4 Dec., 1942, pp. 1-8.)
623	6670	U.S.A.	... *Shattering and Cracking of Artificial Ice During Freezing Prevented by CO_2.* (P. W. West, Ind. and Eng. Chem. (Ind. Ed.), Vol. 34, No. 12, Dec., 1942, pp. 1,515-1,518.)
624	6707	U.S.A.	... *Automatic Control of Riveting.* (Aero Digest, Vol. 41, No. 5, Nov., 1942, p. 184.)
			Road Transport and Tanks.
625	6195	Germany	... *German Tanks on the Russian Front (Photographs),* (l'Auto Italiana, Vol. 23, No. 32, 20/11/42, pp. 8 and 11.)
626	6204	U.S.A.	... *Wooden Tyres for Heavy Transport.* (Sci. Am., Vol. 167, No. 6, Dec., 1942, p. 276.)
627	6644	G.B. ...	... *British Tanks (from the British Ministry of Information).* (Motor Schaw., Vol. 6, No. 8, Aug., 1942, pp. 315-317.)
628	6645	Germany	... *War Experiences with German Synthetic Rubber Tyres (Photograph).* (Motor Schau., Vol. 6, No. 8, Aug., 1942, pp. 322-325.)
629	6647	Germany	... *12-Wheeled Trolley for Road Transport of Railway Trucks.* (I. Culemeyer, Motor Schau., Vol. 6, No. 8, Aug., 1942, pp. 326-330.)
630	6723	Germany	... *Road Design Based on Kinematic Requirements of Vehicles.* (P. Brauer, Ing. Archiv., Vol. 13, No. 1, Feb., 1942, pp. 9-14.)
631	6759	Germany	... *The Design of the Engine Cooling Installation for Transport Vehicles (Digest).* (Z.V.D.I., Vol. 86, No. 49-50, 12/12/42, pp. 755-756.)
			Wireless and Electricity.
			Wireless (General).
632	6306	G.B. ...	... *Future of Trans-Oceanic Telephony.* (Nature, Vol. 150, No. 3,793, 11/7/42, pp. 60-62.)
633	6596	G.B. ...	... *Repeater Circuit for a Relay Station.* (Elect. Eng., Vol. 15, No. 180, Feb., 1943, p. 387.)

ITEM NO.	R.T.P. REF.			TITLE AND JOURNAL.
634	6656	G.B.	...	*Frequency Modulation* (*Nature of F.M. Carrier*). (C. Tibbs, Wireless World, Vol. 49, No. 1, Jan., 1943, pp. 2-5.)
635	6657	G.B.	...	*C.R. Tuning Indicator* (*Magic Eye*). (G. A. Hay, Wireless World, Vol. 49, No. 1, Jan., 1943, p. 9.)
636	6662	U.S.S.R.	...	*The Reflection of an Electromagnetic Impulse from the Heavyside Layer.* (V. L. Guisburg, J. of Physics, Vol. 6, No. 344, 1942, pp. 167-174.)
				Short Waves.
637	6303	Peru	...	30 *KW. Short Wave Radio Transmitter at Lima* (*Peru*). (Nature, Vol. 150, No. 3,793, 11/7/42, pp. 52-53.)
638	6311	G.B.	...	*A Study of Propagation Over the Ultra Short Wave Link between Guernsey and England* (5 *and* 8 *m.*). (R. L. Smith and A. E. Stickland, J. Inst. Elect. Eng., Vol. 89, Pt. 1, No. 24 and Index, Dec., 1942, pp. 538-539.)
639	6386	G.B.	...	*Short Wave Broadcasting.* (Nature, Vol. 151, No. 3,818, 2/1/43, pp. 17-18.)
640	6387	G.B.	...	*Ultra Short Wave Propagation.* (Nature, Vol. 151, No. 3,818, 2/1/43, pp. 31-32.)
641	6658	G.B.	...	*Velocity Modulation U.H.F. Generators* (*Klystron and Monotron*). (G. Bocking, Wireless World, Vol. 49, No. 1, Jan., 1942, pp. 16-18.)
642	6659	G.B.	...	*Modified Views on Propagation of Short Waves* (*E. and F. Layer Phenomena*). (Wireless World, Vol. 49, No. 1, Jan., 1943, pp. 30-31.)
				Magnetism and Electricity.
643	6312	G.B.	...	*A Differential Electronic Stabilizer for A.C. Voltages.* (A. Glynne, J. Inst. Elect. Engs., Vol. 89, Pt. 1, No. 24 and Index, Dec., 1942, pp. 538-539.)
644	6595	G.B.	...	*Eddy Current Losses in Single Conductor Load Covered Cables.* (Nature, Vol. 151, No. 3,820, 16/1/43, p. 88.)
645	6660	U.S.S.R.	...	*Theory of Magnetization and Hysteresis of Polycrystalline Ferromagnetics.* (E. Kondousky, J. of Physics, U.S.S.R., Vol. 6, No. 3 and 4, 1942, pp. 93-110.)
646	6668	U.S.A.	...	*Liquid Dielectrics* (*Power Factor, Conductivity and Polar Contents*). (J. D. Piper and others, Ind. and Eng. Chem. (Ind. Ed.), Vol. 34, No. 12, Dec., 1942, pp. 1,505-1,509.)
				Light.
647	6214	U.S.A.	...	*Contact Lenses.* (A. Callahan, Sci. Am., Vol. 167, No. 6, Dec., 1942, pp. 267-269.)
648	6304	G.B.	...	*Optics Applied to Engineering.* (Nature, Vol. 150, No. 3,792, 11/7/42, p. 53.)
649	6552	U.S.A.	...	*Fresnel Reflection of Diffusing Incident Light.* (D. B. Judd, J. Res. Bur. Stands., Vol. 29, No. 5, Nov., 1942, pp. 329-332.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
650	6592	G.B. ...	... *Luminescence and Colour.* (Nature, Vol. 151, No. 3,820, 16/1/43, pp. 73-75.)
651	6661	U.S.S.R.	... *The Mechanism of Luminescence of Phosphors.* (V. V. Antonov-Romanovsky, J. of Physics, U.S.S.R., Vol. 6, No. 3 and 4, 1942, pp. 120-140.)
			Heat (Boilers and Heaters).
652	6438	G.B. ...	... *Industrial Fuel Efficiency—Heat Insulation and Lagging.* (Metal Industry, Vol. 62, No. 4, 22/1/43, pp. 53-54.)
653	6543	U.S.A.	... 1,825 *lb. Pressure Topping Unit, with Special Reference to Forced Circulation Boiler (and Supplement).* (F. S. Clarke and others, Annual Meeting of the A.S.M.E., Power Division, 30 Nov.-4 Dec., 1942, pp. 1-12.)
654	6545	U.S.A.	... *Development and Performance of a Coal-Fired Unit Heater.* (R. M. Rush, Annual Meeting of the A.S.M.E., Power Division, 30 Nov.-4 Dec., 1942, pp. 1-8.)
655	6820	U.S.A.	... *Some Ways to Avoid High Stoker Maintenance and Retain Good Combustion.* (A. R. Mumford, A.S.M.E. Annual Meeting, Dec., 1942, Paper No. 108.)
656	6822	U.S.A.	... *The Influence of Non-Uniform Development of Heat upon the Temperature Distribution in Electrical Coils and Similar Heat Sources of Simple Form.* (Max Jakob, A.S.M.E. Annual Meeting, Dec., 1942, Paper No. 110.)
			Meteorology (Thunderstorms).
657	6562	G.B. ...	... *The Separation of Electricity in Clouds.* (J. A. Chalmers, Phil. Mag., Vol. 34, No. 228, Jan., 1943, pp. 63-67.)
659	6605	U.S.A.	... *Thunderstorm Characteristics and Flight Procedure.* (J. A. Browne, J. Aeron. Sci. (Rev. Sect.), Vol. 1, No. 9, Dec., 1942, pp. 5-19.)
			Physiology (Aviation Medicines).
660	6332	Germany	... *CO Content of Tobacco Smoke.* (J. G. de Vorgd, Gas, Vol. 14, No. 5, May, 1942, pp. 89-90.)
661	6384	G.B. ...	... *The Physiological Theory of Colour Perception.* (R. Grant, Nature, Vol. 151, No. 3,818, 2/1/43, pp. 11-14.)
662	6453	G.B. ...	... *Problems in the Medical Examination of Recruits. (Med. J., Australia, 1941, Aug., 2, Vol. 2, No. 5, pp. 108-110.)* (A. B. Anderson, Bull. of War Medicine, Vol. 2, No. 5, May, 1942, p. 420.)
663	6454	G.B. ...	... *Modifications of Resistance to Anoxia, with Especial Reference to High Altitude Flying. (Amer. J. Med. Sci., Sept., 1941, Vol. 202, No. 3, pp. 336-341.)* (A. L. Barach and others, Bull. of War Med., Vol. 2, No. 5, May, 1942, p. 420.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
664	6455	G.B.	*The Effect of Low and High Oxygen Tensions on Mental Functioning.* (*J. Aviation Med., March* 1941, *Vol.* 12, *No.* 1, *pp*, 30-35.) (A. L. Barach, Bull. of War Med., Vol. 2, No. 5, May, 1942, p. 420.)
665	6456	G.B.	*Combat of Fatigue by Active Substances.* (*Deut. Med. Woch., April 12th*, 1940, *Vol.* 66, *p.* 398.) (T. Morell, Bull. of War Med., Vol. 2, May, 1942, pp. 420-421.)
666	6457	G.B.	*Eye Protection for Aviators.* (*U.S. Nav. Med. Bull., Oct.*, 1941, *Vol.* 39, *No.* 4, *pp.* 565-567.) (S. E. Flynn, Bull. of War Med., Vol. 2, No. 5, May, 1942, p. 421.)
667	6458	G.B.	*"Night Blindness"—a Psycho-Physiological Study.* (*Brit. Med. J., Oct. 25th to Nov. 1st*, 1914, *pp.* 571-575 *and* 607-611.) (E. Wittkower and T. F. Rodger, Bull. of War Med., Vol. 2, No. 5, May, 1942, pp. 421-422.)
668	6459	G.B.	*The Nature of Dark Adaptation.* (*Brit. J. Psychol., Vol.* 32, *Pt.* 1, *July*, 1941, *pp.* 62-81.) (K. J. W. Craik and M. D. Vernon, Bull. of War Med., Vol. 2, No. 5, May, 1942, p. 422.)
669	6460	G.B.	*Manœuvre for the Relief of Acute Aero-Otitis Media,* (*J. Aviation Med., Vol*, 12, *No.* 2, *June*, 1941, *pp.* 163-168.) (H. Lamport, Bull. of War Med., Vol. 2, No. 5, May, 1942, pp. 422-423.)
670	6461	G.B.	*Measurements of the Tension of the Tympanic Membrane and of the Resistance of the Eustachian Tube.* (*Arch. Otolaryngol, Vol.* 34, *No.* 3, *Sept.*, 1941, *pp.* 596-602.) (H. A. E. van Dishoeck, Bull. of War Med., Vol. 2, No. 5, May, 1942, pp. 423-424.)
671	6462	G.B.	*Combined Electro-Cardiography, Stethography and Cardioscopy in the Selection of Pilots.* (*J. Aviat. Med., Vol.* 12, *No.* 1, *March.* 1941, *pp.* 2-27.) (L. M. Bartlett and J. B. Carter, Bull. of War Med., Vol. 2, No. 4, March, 1942, p. 325.)
672	6463	G.B.	*Testing Night Vision.* (*Brit. Med. J., Sept.*, 1941, *pp.* 347-349.) (N. B. Harman, Bull. of War Med., Vol. 2, No. 4, March, 1942, p. 326.)
673	6464	G.B.	*Effects of Reduced Atmospheric Pressures on the Electro-Encephalogram.* (*J. Aviation Med., Vol.* 12, *No.* 2, *June*, 1941, *pp.* 115-125.) (R. S. Lyman and others, Bull. of War Med., Vol. 2, No. 4, March, 1942, p. 326.)
674	6465	G.B.	*Certain Observations in Low-Nitrogen, Normal-Oxygen Atmospheres Related to the Problems of High Altitude Flying.* (*New England J. of Med., Vol.* 225, *No.* 7, *Aug.* 14*th*, 1914, *pp.* 255-258.) (A. M. Butler and others, Bull. of War Med., Vol. 2, No. 4, March, 1942, pp. 326-327.)

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675	6466	G.B.	... ...	*Fundamental Principles in the Adjustment Reactions of the Organism to Anoxia.* (*Am. Intern. Med., Vol.* 14, *No.* 9, *March*, 1941, *pp.* 1,518-1,532.) (E. Gellhorn, Bull. of War Med., Vol. 2, No. 4, March, 1942, pp. 327.)
676	6467	G.B.	... ...	*Prophylaxis Against Lethal Effect of High Altitude by Means of a Digitalis Glycoside* (*Gitalin*). (*American Heart J., Vol.* 21, *No.* 5, *May*, 1941, *pp.* 545-550.) (E. Fisher, Bull. of War Med., Vol. 2, No. 4, March, 1942, p. 327.)
677	6468	G.B.	... ...	*Necessity of Emergency Oxygen Unit for Use in Parachute Escapes at High Altitudes.* (*J. Aviation Med., Vol.* 12, *No.* 2, *June*, 1941, *pp.* 126-130.) (W. M. Boothby, Bull. of War Med., Vol. 2, No. 4, March, 1942, p. 327.)
678	6469	G.B.	... ...	*Recent Developments in Aviation Medicine.* (*New Eng. J. of Med., Vol.* 225, *No.* 7, *Aug.* 14, 1941, *pp.* 263-268.) (J. F. Fulton, Bull. of War Med., Vol. 2, No. 4, March, 1942, p. 327.)
679	6470	G.B.	... ...	*The Protection of Hearing.* (*J. Laryngol and Otology, Vol.* 56, *No.* 7, *July*, 1941, *pp.* 225-242.) (E. D. Dickens and A. L. Ewing, Bull. of War Med., Vol. 2, No. 4, March, 1942, pp. 327-328.)
680	6473	G.B.	... ...	*Physiological Effects of High Altitude.* (*U.S. Nav. Med. Bull., Vol.* 39, *No.* 2, *April*, 1941, *pp.* 163-178.) (H. R. Behnke and T. L. Willman, Bull. of War Med., Vol. 2, No. 3, Jan., 1942, pp. 236-237.)
681	6474	G.B.	... ...	*Changes in Intracranial Volume on Ascent to High Altitudes and Descent in Diving.* (*Proc., Staff Meeting of Mayo Clinic, Vol.* 16, *No.* 14, 1941, *pp.* 220-221.) (M. N. Walsh, Bull. of War Med., Vol. 2, No. 3, Jan., 1942, p. 237.)
682	6475	G.B.	... ...	*Altitude Tolerance in Hyper and Hypo-Tonia.* (*Luftfahrtmed.*, 1941, *p.* 11.) (Kriemberg and Winter, Bull. of War Med., Vol. 2, No. 3, Jan., 1942, p. 237.)
683	6476	G.B.	... ...	*Nature of Pain in High Flights.* (*Klinicheskaya Med., Moscow, Vol.* 18, *No.* 9, 1940, *p.* 42.) (Streltsav, Bull. of War Med., Vol. 2, No. 3, Jan., 1942, pp. 237-238.)
684	6477	G.B.	... ...	*The Influence of Altitude Flying on Gastric Function.* (*Luftfahrtmed., Vol.* 4, *Pt.* 2, 1940.) (Bull. of War Med., Vol. 2, No. 3, Jan., 1942, p. 238.)
685	6478	G.B.	... ...	*Transportation of Patients by Airplane.* (*Procs., Staff of Mayo Clinic, Vol.* 16, *No.* 14, 1941, *pp.* 221-223.) (L. R. Lovelace, Bull. of War Med., Vol. 2, No. 3, Jan., 1942, pp. 238-239.)
686	6480	G.B.	... ...	*Hypotension in Aviation. With a Review of* 159 *Fatal Crashes.* (*U.S. Nav. Med. Bull., Vol.* 39, *No.* 2, *April*, 1941, *pp.* 222-235.) (C. A. Young, Bull. of War Med., Vol. 2, No. 2, Nov., 1941, p. 145.)

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687	6481	G.B.	... ...	*Acclimation to High Altitudes. A Review of Physiological Observations.* (*U.S. Nav. Med. Bull, Vol.* 39, *No.* 2, *April*, 1941, *pp.* 178-187.) (C. L. Gemmill, Bull. of War Med., Vol. 2, No. 2, Nov., 1941, p. 145.)
688	6482	G.B.	... ...	*Aero-Otitis Media in Compressed Air Workers. Treatment with Helium-Oxygen Mixtures.* (*J. American Med. Ass., Vol.* 116, *No.* 6, *April* 19*th*, 1941, *pp.* 1,766-1,769.) (W. H. Requarth, Bull. of War Med., Vol. 2, No. 2, Nov., 1941, pp. 145-146.)
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696	6604	Germany	...	*On the Use of Stimulants to Promote Gaseous Exchanges in the Body Under Condition of Work at Low Pressure.* (A. Rühl and others, Luftfahrtmedizin, Vol. 3, No. 2, 1938-1939, pp. 285-301.)
697	6665	U.S.A.	...	*Insecticidal Aerosol Production* (*Spraying Solutions in Liquefied Gases*). (L. D. Goodhice, Ind. and Eng. Chem. (Ind. Ed.), Vol. 34, No. 12, Dec., 1942, pp. 1,456-1,459.)
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699	6741	Germany	...	*The Problem of Aero Embolism* (*Effect of Reduced Pressure at High Altitudes*). (W. Hornberger, Luftwissen, Vol. 9, No. 12, Dec., 1942, pp. 339-341.)

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700	6747	Germany	...	*On the Visibility of Ground Targets for Heights of Approach of the Order of* 2,000-3,000 *m.* (F. Löhle, Luftwissen, Vol. 9, No. 12, Dec., 1942, pp. 349-352.)
701	6748	Germany	...	*Physiological Research in Aid to Aircraft Development (Digest of Lilienthal Lecture).* (P. Rein, Luftwissen, Vol. 9, No. 12, Dec., 1942, pp. 363-364.)

Mathematics and Physics (including Refrigeration).

702	6305	G.B. ...	...	*Raman's Theory of the Specific Heat of Crystals.* (Nature, Vol. 150, No. 3,793, 11/7/42, p. 55.)
703	6560	G.B. ...	...	*An Extension of Nomography.* (C. W. Hansel, Phil. Mag., Vol. 34, No. 228, Jan., 1943, pp. 1-26.)
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705	6631	G.B. ...	...	*Newton Physics (Historical Survey).* (H. Buckley, Engineering, Vol. 155, No. 4,021, 5/2/43, pp. 103-104.)
706	6724	Germany	...	*Indefinite Integrals Containing Products of Cylindrical Functions.* (R. Straubel, Ing. Archiv., Vol. 13, No. 1, Feb., 1942, pp. 14-20.)
707	6725	Germany	...	*The Damping of Non-Linear Vibrations (the General Case of Amplitude Modulation).* (T. Zech, Ing. Archiv., Vol. 13, No. 1, Feb., 1942, pp. 21-33.)
708	6726	Germany	...	*The Accuracy of Various Methods of Integration of Ordinary Differential Equations of the First and Second Order (Interpolation and Extrapolation).* (L. Collatz and R. Zurmuhl, Ing. Archiv., Vol. 13, No. 1, Feb., 1942, pp. 34-36.)
709	6765	Germany	...	*A Novel Treatment of the Equation of Motion of a Gyroscope Supported at One Point (Eulerian Co-ordinates).* (E. Schneller, Ing. Archiv., Vol. 13, No. 3, 1942, pp. 113-118.)
710	6795	Germany	...	*Friction of Wire Ropes on Pulleys (Digest).* (L. Klein, Z.V.D.I., Vol. 86, No. 35-36, 5/9/42, p. 554.)

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711	6314	G.B. ...	...	*The Industrial Library and Information Service.* (B. J. Ledaux, Automobile Engineer, Vol. 33, No. 432, Jan., 1943, pp. 29-30.)
712	6381	G.B. ...	...	*A.S.L.I.B. 17th Annual Conference.* (Nature, Vol. 150, No. 3,813, 28/11/42, pp. 637-638.)

ABSTRACTS FROM THE SCIENTIFIC AND TECHNICAL PRESS.

Issued by the

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(Prepared by R.T.P.3.)

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NOTE.—As far as possible, the country of origin quoted in the items refers to the original source.

Heat Transfer and Friction in the Turbulent Boundary Layer of a Compressible Gas at High Speeds. (F. Frankl and V. Voishel, C.A.H.I. Rept. No. 240, Moscow, 1935.) (R.T.P. Translation No. T.M. 1,032.) (110/8349 U.S.S.R.)

In the first part of this paper, the authors consider the two-dimensional problem of a flat plate exposed to symmetrical flow. The x axis is along the plate, the u component of the velocity being in the direction of flow.

Under these conditions, we have for the turbulent region of flow

$$\frac{d\bar{u}}{dt} = -\frac{\partial \tau_{xy}}{\partial y} \quad . \quad . \quad . \quad . \quad . \quad . \quad (1)$$

$$\bar{\rho}\frac{d}{dt}\left(JC_pT + \frac{\bar{u}^2}{2}\right) = -\frac{\partial}{\partial y}\left(\bar{u}\tau_{xy} - J\frac{\partial q_y}{\partial y}\right) \quad . \quad . \quad . \quad (2)$$

where τ = turbulent shearing stress.

q = heat transfer per unit area and time.

(The bar indicates mean values.)

Now

$$\tau_{xy} = A\frac{\partial \bar{u}}{\partial y}$$

where A = coefficient of turbulent apparent viscosity.

$$\text{and } q_y = \Lambda\frac{\partial \overline{T}}{\partial y}$$

$$\therefore \Lambda = AC_p$$

Substituting in (1) and (2) above, we find that both the velocity u and the total energy $(JC_pT+u^2/2)=l$ satisfy the same linear differential equation. All boundary conditions are therefore satisfied if

$$JC_pT+u^2/2=au+b \quad . \quad . \quad . \quad . \quad . \quad (3)$$

when a and b are independent of y.

Turning now to the laminar sublayer which modern theory indicates as being always present we have

$$\tau_{xy}=\mu\frac{\partial u}{\partial y}$$

$$q_y=\lambda\frac{\partial T}{\partial y}$$

As there must be continuity of flow over the entire region from laminar sublayer to fully turbulent outside, there can be no discontinuity in $\partial u/\partial y$ and $\partial T/\partial y$ at the surface (index 1) where the laminar sublayer merges into the turbulent surrounding stream. If we now make the further important assumption that both u and T vary linearly across the laminar layer (*i.e.*, dissipation of energy in layer is neglected) we have

$$A_1\left[\frac{\partial u}{\partial y}\right]_1=\tau \text{ at surface of plate.}$$

$$\Lambda_1\left[\frac{\partial T}{\partial y}\right]_1=q \text{ at surface of plate.}$$

Now from (3) it follows that

$$e-e_1=\left[\frac{\bar{e}-e_1}{\bar{u}-u_1}\right](u-u_1)$$

$$i.e., \quad \left[\frac{\partial e}{\partial y}\right]_1=\left[\frac{\bar{e}-e_1}{\bar{u}-u_1}\frac{\partial u}{\partial y}\right]_1$$

From this it follows that

$$u_1+\frac{J_q}{\tau}=\frac{\bar{e}-e_1}{\bar{u}-u_1}$$

Finally, if both T and u vary linearly with thickness of sub-laminar layer

$$T_1=T_*+\frac{q}{\lambda_*}\frac{\mu_*}{T}u_1$$

where the asterisk denotes values at the surface of the plate. It is thus possible to obtain an expression for q involving, besides known boundary values and physical constants, the velocity u_1 at the transition between laminar and superposed turbulent layer.

The authors extend the Kármán hypothesis and assume:—

$$\frac{u_1}{u}=s\sqrt{\psi_*/2} \text{ to hold in compressible flow.}$$

when s = an absolute constant $(=11.6)$.

ψ_* = frictional coefficient at plate surface.

$$=2\tau/\rho\bar{u}^2.$$

In this manner u_1 is eliminated from the final expression for q.

In an appendix, it is pointed out that energy dissipation must take place in the laminar sublayer and that therefore the linear distribution of temperature assumed above cannot be more than a first approximation.

A parabolic temperature distribution of the type

$$T=T_*-q/\lambda_*y-\frac{\tau^2}{2J\mu_*\lambda_*}y^2$$

is therefore proposed as being in better accord with practical conditions and the expression for q modified accordingly.

As regards friction drag, the authors restrict themselves to the case of the turbulent boundary layer in a flow at constant velocity and zero angle of attack. It is assumed that the fundamental equation of the Kármán turbulence theory remains valid, *i.e.*,

$$k^2\rho\frac{\left(\frac{\partial y}{\partial u}\right)^4}{\left(\frac{\partial^2 u}{\partial y^2}\right)^2}=\tau \qquad . \quad . \quad . \quad . \quad . \quad (4)$$

where τ = friction stress at a distance y from plate.
k = absolute constant.

Assuming constant p and neglecting inertia forces, τ does not depend on y.

By introducing the non-dimensional quantities

$$\eta=\frac{y\sqrt{\rho_*\tau}}{u}$$

$$\phi=u/v_*$$

$$\sigma=\frac{T_*}{T}$$

where $v_*=\sqrt{\tau/\rho_*}$ = so-called friction velocity,

equation (1) reduces to

$$k^2\sigma=\left(\frac{\partial^2\phi}{\partial\eta^2}\right)^2\Big/\left(\frac{\partial\phi}{\partial\eta}\right)^4$$

Making use of the expression obtained in the first part of this paper for the heat transfer q, it is possible to express σ as a function of ϕ and thus solve the differential equation (4).

The authors then show how to obtain the friction coefficient ϕ_* as a function of the Mach number, the Reynolds number $\rho_*\bar{u}x/u_*$ at the point x on the plate and T_*/T.

The calculation is again based on a linear distribution of velocity in the laminar sublayer and hence only a rough approximation.

NOTE.—More details of the calculation are given in a subsequent paper by the same authors, C.A.H.I. Report, No. 321, Moscow, 1937, R.T.P. Translation No. 866.

Temperature in Shock Waves and the Possible Connection with the Luminosity of Meteors. (H. Muraour, Z.G.S.S., Vol. 37, No. 9, Sept., 1942, pp. 166-169.) (110/7156 France.)

The author has carried out experiments on the luminous effect accompanying the detonation of high explosive such as Tetranitromethane-Toluol, Hexagon and Nitropental in an atmosphere of argon or helium. The flash of light accompanying these explosions is of very short duration (4×10^{-6} sec.) but reaches a very high intensity (about 1,000 times that of flashlight powder).

The following table gives calculated value for air and argon, T_2 being expressed in °C. absolute:—

	Air.		Argon.	
P_2/P_1	V (m. sec.)	T_2	V (m. sec.)	T_2
2	452	336	413	364
5	698	482	631	585
10	978	705	882	932
20	1369	1126	1240	1618
30	1676	1522	1515	2300
50	2150	2260	1950	3670
100	3020	3860	2760	7080
200	4220	6475	3900	13910
400	5900	10520	5510	27570
1000	9210	19100	8710	68500

The energy distribution in the spectrum corresponds to that of black body radiation of a temperature of about 35,000°C. Theory indicates a definite relationship between the speed of propagation V of such shock waves and the ratio of the temperature and pressures in the wave to the value existing immediately in front of the wave.

It will be noted that for the same pressure ratio, the speed of propagation is slightly higher for air, but that the temperature especially at the higher pressure ratios is considerably lower than in the case of argon. This is due to difference in specific heat values due to heat loss endothermic reactions and ionisation phenomena, the practical temperature will probably be lower than those given in the table, but no experimental data are available.

There is no theoretical difference between shock waves produced by detonation and those accompanying a body travelling at supersonic speed, nor is there a theoretical limit to the speed of propagation of such waves—detonation waves travelling at 16,000 m./sec. have been observed. Since, however, the highest speed of a bullet is less than 3,000 m./sec., luminous phenomena accompanying translation of a body have not so far been observed in the laboratory.

Very high speeds, however, are observed in the case of meteors and shooting stars (10-100 km./sec.).

Their luminous effects are however restricted to high altitude and the question arises whether shock wave can arise at the corresponding low atmospheric pressure (.004 to 2 mm. of mercury). In the case of explosives detonating under reduced pressure, luminous phenomena have been recorded at pressure as low as 10^{-3} mm., but it is not certain whether the light in this case does not originate in the products of combustion.

The author considers it, however, as highly probable that the luminescence of meteors during the last portion of their travel (altitudes of 30 km. pressure or 8 mm. Hg.) can be accounted for by the shock wave. This would also account for the apparent increase in diameter of the source of light with decreasing altitude, as is well known, apparent diameter of 100 and even a 1,000 m. have been recorded for the luminous ball, whilst the true diameter of the meteor is almost certainly much smaller.

This can be accounted for by multiple shock waves being produced as the meteor breaks up in its descent.

The noise accompanying the drop of the meteor in many cases also points to the presence of a shock wave.

Similar luminous phenomena have been observed to accompany explosive eruption of volcanoes.

In conclusion the author pleads for more experimental work on these interesting phenomena.

Wing Loading at High Speeds. (W. Wirz, Flugwehr und Technik, Vol. 4, No. 4, April, 1942, p. 97.) (Digest of lecture given at the E.T.H.) (110/3377 Switzerland.)

Under high speed conditions, the wing loading of an aircraft undergoes a change due to compressibility effects. According to the Prandtl theory, the stream lines are curved to a greater extent under such conditions and this causes a change both in the magnitude and position of the resultant aerodynamic forces.

In addition, wing twist is likely to occur and this causes a change in the angle of incidence along the wing, which in its turn effects the distribution of the load.

Such effects become specially marked during a high speed dive with deflected ailerons and may lead to loss of lateral control or reversal of aileron effect.

In the German strength specifications wing stressing during a dive with aileron action is specially considered (load case 138) and it is laid down that structural

safety must be ensured when the aileron deflection is such that an angular velocity of roll $w = .1\ v/b$ is maintained (v = speed of dive, b = total span of wing).

For a rigid wing this corresponds to a constant aileron deflection β (independent of v) and reasonable stressing.

If the wing is however flexible, β increases rapidly with v, becoming infinite at the critical speed corresponding to aileron reversal.

At any given speed v, the torsional stressing of the wing also increases rapidly with increasing flexibility and becomes infinite at the critical wing flexibility.

It thus appears that it may not be possible to reach the angular velocity w laid down in the German specification (control force insufficient) and that in any case wing flexibility introduces severe limitations to the permissible diving speed.

It is concluded that the original specification were drawn up for rigid wings and should be revised so as to correspond more closely to modern designs.

High speed flight require thin sections and it is very difficult to ensure adequate stiffness of the light weight cantilever wings at present in use.

The author is of the opinion that braced monoplane wings or even biplane arrangements deserve renewed attention. Such alternative solutions can be designed to give adequate stiffness without a serious increase in weight. The difficulty will be to design the struts and other fuselage attachments so that their resistance is sufficiently low. In this connection the possibility of designing such components so as to contribute to the lift instead of producing drag only requires serious consideration.

The Horten IV Glider of the Flying Wing Type. (G. Horten, Flugsport, Vol. 34, No. 4, 18/2/42, pp. 51-55.) (110/1177 Germany.)

Photographs show the aircraft on the ground and in flight. Details of the controls as well as drawings of the glider are also given.

The following are the principle characteristics:—

Span	20 m.
Wing area	19.1 m.^{2}.
Aspect ratio	21.
Structural weight	240 kg.
Flying weight	350 kg.
Wing loading	18.3 kg./m.^{2}.
Gliding ratio	37
Rate of vertical descent	.5 m./sec.
Profile thickness at root	10 per cent. of chord.
Dihedral	6° } judged from drawing.
Sweepback	20° } judged from drawing.

Of special interest is the almost prone position of the pilot inside the central wing section (1.6 in. wide). This is of tubular steel construction, the spars forming a bridge across which is suspended a hammock making an angle of 30° with the direction of flight. This in its turn supports the upper portion of the pilot's body, whose knees and feet are housed in a sheet metal "boot" projecting below the wing. The pilot's head then projects only slightly above the normal wing surface and is enclosed in a transparent fairing.

Each wing is fitted with five flaps, of which two (situated respectively above and below the wing nose) project vertically outwards and replace the normal rudder control. They can also be used as diving brakes and are operated by the pilot's feet. The other three flaps are hand controlled and interlinked so as to operate either as aileron or elevator. In this way an effect equivalent to a continuous wing warping can be produced, the differential action reducing the tendency to yaw about the vertical axis when the aircraft is banked.

The inner wing is made of wood whilst the outer tips (2 m. long) are of metal construction.

Counting the central section (tubular steel) the aircraft thus consists of five parts and can be assembled by three men in about five minutes.

The Horten "Flying Wing" Glider—Constructional Details. (G. Horten, Flugsport, Vol. 35, No. 6, 17/3/43, pp. 63-67.) (110/8897 Germany.)

The glider described in Abstract 110/1177 has now carried out over 220 hours flying, including sailing for 9¼ hours under difficult weather conditions (several hours blind flying in clouds).

It appears that about 50 hours flight experience is required before the pilot becomes really used to the prone position and controls the aircraft efficiently. After this period of training, however, the concensus of opinion is that the prone position is less tiring than the normal bucket seat.

In the present article the author gives further constructional details of his glider and discusses some improvements introduced.

The latter mainly concern the hammock support for the body of the pilot. This support is now well padded with sponge rubber and provided with a firm adjustment ensuring utmost comfort. Similarly the recess below the wing for the knees and feet is rendered adjustable so as to provide for an even distribution of the weight.

Improvements have also been carried out in the control rod assembly and the split nose flaps originally fitted for rudder control have been replaced by the more modern perforated diving brakes requiring smaller control efforts.

An elastic strip of electron metal serves as a seal when the brakes are retracted. It is stated that this seal remains in perfect contact even if the wing undergoes considerable deflection.

Spring controlled skids are fitted below the nose of the central wing section and to the rear of the recess housing the pilot's legs.

To reduce friction during take-off, a nose wheel is incorporated, which is jettisoned when the glider is airborne.

The equipment now includes an accumulator battery for warming the pilot's gloves and operating the twin indicator. An oxygen bottle is housed in the "boot" and can be charged from the outside.

In an emergency, a quick release jettisons the cockpit cover and also unfastens the pilot's straps. It is stated that a parachute jump presents no difficulties.

Photographs illustrate various design features.

Comparison of Various Methods for Determining Flight Speed at Great Altitudes. (R. Schmidt, Luftwissen, Vol. 9, No. 9, Sept., 1943, pp. 270-275.) (110/7451 Germany.)

The usual method of determining flight speed from the dynamic pressure record is subject to a number of errors. The chief difficulty is an accurate determination of the static pressure, this measurement being easily falsified by interference from the aircraft structure. The air temperature is also not easily measured at high speeds (stagnation at thermometer) and the dynamic pressure as recorded by a pressure capsule is likely to be affected by hysteris and changes in elasticity of the diaphragm with temperature.

Finally the effect of Mach number on the dynamic pressure is not accurately known. The Dornier works have developed an alternative method for determining flight speed which works on the anemometer principle and is known as an air log. In the absence of friction, the speed of rotation of a small propeller is directly proportional to the relative air speed and by towing the log some distance below the aircraft, interference effects can be easily overcome. The propeller pitch is 4.4 m. which correspond to about 30 revs. per sec. at an air speed of 130 m./sec. The instrument is of torpedo shape and weighs about 8.5 kg. It is suspended from a 30 m. cable and is kept automatically at a certain distance

below the aircraft by the action of the negative lift of two lateral wings which counteract the tendency of the cable to rise due to air drag.

Although great care was taken to eliminate the errors inherent in the dynamic pressure method as far as possible, it appears single speed measurements are subject to an error of ± 2 per cent. which can be reduced to ± 1 per cent. if a series of readings are taken and the records suitably averaged. Even under these conditions, however, the errors are three to ten times as those of the log. The great accuracy of the latter makes it specially suitable for investigating small speed changes accompanying differences in drag or airscrew performance. As an example, the effect of painting the suction side of an airscrew blade with anti-glare varnish produced a change in speed of .7 per cent. compared with the polished airscrew under otherwise similar circumstances. If the varnish was further roughened by the addition of sand, the speed of the aircraft dropped by 1.4 per cent. This corresponds to a reduction in airscrew efficiency of 1.4 and 4.2 per cent. respectively.

Tricycle Landing Gears. (Inter. Avia., No. 854-855, 3/2/43, pp. 1-5.) 110/8858 U.S.A.)

1. The susceptibility of the conventional tail wheel landing gear to nosing over, under a strong braking effect, its inherent tendency to ground-loop particularly in a side wind, and the necessity of making a full-stall landing to prevent bouncing have made it less and less satisfactory as landing speeds increased. The tricycle landing gear will eliminate these undesirable characteristics if properly designed, but it may introduce other objectionable features peculiar to its type. Some of these are porpoising, longitudinal instability with the nose wheel off the ground, shimmy of the nose wheel, and failure of the nose wheel strut from excessive dynamic loads. In addition, it should be remembered that the elimination of the faults of the conventional gear will result in increased loads on the tricycle gear and airframe structure. The removal of the possibility of nosing over will lead to faster taxying and manœuvring on the ground; the elimination of the ground loop tendency will result in more cross-wind landings, and the lack of any tendency to bounce will mean more landings at high sinking speeds.

2. The general load distribution of the aeroplane naturally plays a decisive rôle in the determination of the landing gear loads. In order to illustrate these conditions, it is possible to represent the aircraft by an arrangement of two concentrated masses, one of which is located directly over the nose wheel and corresponds to the load produced by the landing impact in a nose wheel first landing, whereas the second is located at a distance aft of the c.g. determined by the distance of the nose wheel from the c.g. and the aeroplane's radius of gyration. A calculation carried out with a single-engined, single-seater tricycle areoplane, driven by an engine and tractor airscrew mounted in the nose, has revealed a radius of gyration of nearly 18.4 per cent. of the aircraft length, whereas the distance of the nose wheel from the c.g. is between 20 and 35 per cent. of the aircraft length. This means that between 46 and 22 per cent. of the aircraft weight acts on the nose wheel; since the static percentage is usually only about 15 per cent., the error in designing from the load in the three-wheel attitude may exceed 200 per cent., assuming the same sinking speed in both conditions. These figures apply only to the type of aeroplane outlined above, while they vary widely in aircraft of other types, depending upon loading conditions, size, etc.; the ratios between nose-first and three-wheel percentages of weight acting on the nose wheel have been found to vary from 4 : 1 to $1\frac{1}{2}$: 1.

In order to reduce the weight actually on the nose wheel, it is useful to select the largest possible distance between the nose wheel and the c.g.; it is wise, furthermore, to make the travel of the nose wheel considerably greater than that of the main wheels, by which means the acceleration in a nose-wheel-first landing and thus the loads on the nose wheel and structure will be reduced.

3. Of much greater importance than the location of the nose wheel is the *distance of the main wheels aft of the centre of gravity* because it affects more of the properties than any other single characteristic. It influences not only the directional and longitudinal stability, the length of take-off run and the static reaction on the nose wheel, but also the ability to land with excess air speed and high sinking speeds without bouncing.

4. The two requirements outlined restrict the location of the main wheels in relation to the centre of gravity of the aircraft to a small area. The most favourable location of the main wheels is at the minimum distance from the aeroplane's c.g., as determined by the necessity that the c.g. must be situated ahead of the main wheels even when the tail buffer touches the ground.

5. The ready *steerability* during taxying, which may be of importance during the take-off of the tricycle aeroplane, is determined by the distance of the rear wheels aft of the c.g. and the height of the c.g. above the ground line; neither of these dimensions is related to the tread. Since tricycle aeroplanes are inherently directionally stable as long as the main wheels are situated aft of the c.g., the problem becomes one of the degree of directional stability desired. While in a conventional aeroplane the pilot must counteract instability during the execution of a taxying turn or during the landing or take-off by means of differentially operating the wheel brakes, the conditions are just the contrary in the case of a tricycle landing gear; in order to make a taxying turn, the stabilising moment of the nose-wheel landing gear must partly be eliminated. Accordingly, the sharpness of the turn depends on the magnitude of the turning moment that can be applied, which, assuming the turning is done by differential braking, depends on the wheel tread and tyre coefficient of friction. As long as the aeroplane runs at a certain speed, sharp changes of direction are not possible. A normal single-seater fighter, for example, whose tread is assumed to be 8.33 ft., the wheel base 10 ft., the distance of the nose wheel from the c.g. 8.75 ft., and the height of the c.g. above the ground line 5.0 ft., has a turn radius of 175 ft. at a taxying speed of 30 m.p.h. with one main wheel completely blocked. Since the radius is proportional to the square of the speed, no serious consequences would result from locking one wheel even when landing. By increasing the tread, the steering characteristics of the aeroplane are improved somewhat; however, a turn radius less than the minimum should be avoided, owing to the sidewise sliding of the wheels. The aircraft outlined above, for example, would begin to skid at 30 m.p.h. for a radius of turn of 125 ft.; no matter what the tread was increased to beyond the corresponding 13.75 ft., the aeroplane could not turn around in a circle of less than 125 ft. diameter at 30 m.p.h. The effect of the swivelling nose wheel is a stabilising one but makes itself noticeable only at a very small radii of turn and becomes negligible in radii of five times the tread.

Stratospheric Aviation of the Future. (M. Richon, L'Aerophile, Nov., 1938, pp. 77-84.) (Salon Number.) (110-15813 France.)

The principal object of high altitude flight is the possible gain in speed, over ground level, provided the horse-power can be maintained constant by supercharging. From a military point of view we have the further advantages that at altitudes of the order of 10,000 m., it is practically impossible to spot the aircraft from the ground and the chances of hitting it by A.A. fire are negligible.

Nothing definite is yet known about the meteorological conditions existing at such heights. It was thought originally that the air would be very calm at great altitudes. It is not known that winds of great velocity may exist (200 m.p.h.) and although there are indications that their direction may be relatively constant over certain regions (North Atlantic), considerable turbulence at 12,000 m. has been detected in the South Atlantic. The possibility of employing "trade winds" at great altitude thus requires further confirmation. There is,

however, no question that navigation should be simplified due to the general absence of clouds, which are rarely present about 7,000 m. The main difficulty of high altitude flight is physiological, types of so called altitude sickness being distinguished by the author.

(1) Sense of exhilaration and well being, followed by a sudden loss of consciousness.

(2) Sudden convulsions.

(3) Severe internal pains followed by cramp of the articular and para-articular regions.

(4) Loss of consciousness without preliminary warning.

In order to study these effects on himself, the author, together with Commander Artold, have stayed in the high altitude chamber of Le Bourget for a period of 48 hours at a pressure of 290 mm. corresponding to an altitude of 7,500 m. Oxygen was breathed through a standard mask, the supply being 280 litre/hour.

A complete medical check was kept over this period and no ill effects were noted either during or after the experiment.

A repetition of the test at an altitude of 10,000 m. however had to be terminated after 15 hours, although the oxygen supply (initially 550 litres/hour) was increased occasionally to 800 litres/hour for short periods.

The symptoms described by the author are of interest. Severe internal pains developed after three hours (shoulder, neck, wrist, knees), and could only be rendered supportable by doubling up on the floor of the cabin. The pains somewhat relaxed after six hours, but were followed by extreme lassitude, it being almost impossible to move. The experiment was discontinued for this reason but the lassitude persisted for some time.

It is evident that oxygen breathing by itself is insufficient to ward off ill effects at altitudes above 7,500 m. unless the exposure is of relatively short duration.

Two alternatives present themselves, the pressure suit and the pressure cabin.

The author refers to experiments with pressure suits carried out in France by Rosenstiel, who is stated to have passed 1½ hours in the pressure chamber at an altitude of 14,500 m. wearing a suit of his design. Further experiments are in abeyance.

The firm of Farman has also designed a pressure cabin which unfortunately crashed from 10,000 m. killing the pilot. The reason for the accident is not known and a new design is in hand.

In view of the extensive series of experiments carried out in the U.S.A. and Great Britain, the author urges the importance of France taking a more energetic part in these developments.

Cabin Supercharging in Scheduled Air Line Operation. (R. L. Ellinger, J.S.A.E., Vol. 51, No. 2, Feb., 1943, p. 72.) (Digest and Discussion.) (Preprint available.) (110/9058 U.S.A.)

The author gives some account of experience gained with the Boeing Stratoliner during commercial operation. This aircraft is fitted with a full-flow pressurised ventilating system, the cabin superchargers being supplied with fresh air from the leading edge of the wing and the discharge from the cabin being regulated so as to maintain the absolute pressure in the cabin equal to that normally found at 8,000 feet for " true " altitudes up to 15,000 feet. (True altitude of 20,000 feet corresponds to 12,000 feet " cabin " altitude.) Two superchargers are fitted, each being capable of handling 225 cubic feet of air per minute at an absolute pressure of about 9 lbs. p.s.i. This corresponds to about 12 cubic feet/minute per passenger if the aircraft is fully loaded (33 plus crew of four) and the relatively large volume of air handled renders minor leaks in the cabin skin and door fittings relatively unimportant. As a matter of fact, for most of the pressurised operation, only a single cabin supercharger is required, the

second acting as reserve. The superchargers are driven from the rear of two of the engines and absorb about 25-50 h.p. each.

Continuous high altitude operation was not contemplated with this aircraft. The Stratoliner was designed to fly at higher than the normal altitude only when this becomes necessary from the point of view of passenger comfort and completion of schedule (flying over adverse weather).

Thus over the period January-June, 1941, only 22 per cent. of all the flights were carried out at 10,000 feet and above, requiring supercharging of the cabin. For the remainder of the flights (below 10,000 feet) normal ventilation was employed. Of the supercharged flights, about one-third were at altitudes between 15,000 and 17,000 feet, the highest flight being 23,000 feet for a short period.

In spite of the relatively moderate altitudes of operation, most valuable experience was gained. As already stated, cabin leaks presented no serious difficulties. The cabin had been designed to stand an excess pressure of about 6 lbs. p.s.i. (the normal pressure difference was only of the order of $2\frac{1}{2}$ lb. p.s.i.).

Supercharger control and air conditioning did not prove quite as simple as expected, but a satisfactory solution was found.

Much greater difficulties arose with the cabin superchargers themselves, several bearing failures occurring after less than 200 hours' operation. Such failures generally caused severe damage to the supercharger and its drive, since the installation did not permit disconnecting the supercharger in flight. Particular engines had to be stopped and airscrew feathered. Some form of clutch mechanism is considered essential in future installations.

The aircraft proved exceedingly popular and according to the author there is no question about its commercial justification. The ability of the Stratoliner to fly long stretches of adverse weather, resulted in these craft being the only planes in the air on many occasions when normal passenger planes had to remain grounded on account of their inability to clear the weather with safety and comfort for the passengers.

With further flight experience, the operational altitude of such aircraft will be extended to the commercial ceiling.

Aviation Power Plants. (S. A. Moss, J.S.A.E., Vol. 51, No. 2, Feb., 1943, pp. 69-70.) (Digest and Discussion.) (Preprint available.) (110/9054 U.S.A.)

The so-called integral power plant is a complete power installation built to form the front section of the nacelle and designed, assembled and tested by specialists. Other groups of specialists prepare the plane up to the nacelle fire well and provide the studs to which the power unit is attached. This scheme has the advantage that the engine installation can be quickly removed as a whole for overhaul or replacement. The same plane can thus be fitted with engines of different types or a new type of aircraft fitted with existing engines, provided only that the bulkhead and nacelle outline be standardised. British and German engineers have taken the initiative in developing this idea, which however has not been adopted so far in the U.S.A. It is the object of the author to render the scheme more widely known in America and stipulate research. From the discussion following the paper, it appears that American opinion is still very undecided about the possible merits of the scheme. It was feared that a standardised fireproof bulkhead capable of taking a variety of engine designs would prove unduly large and thus react unfavourably on the aircraft drag. Radiator and oil cooler positions inside the outline of the complete nacelle were also criticised and the necessity of placing turbo-superchargers at some distance from the engines was also stressed. According to A. Nutt (Wright Aeronautical Corporation) efforts to make power plants interchangeable are definitely misdirected. It should rather be the object of the designer to obtain the best power plant for each installation.

On the other hand, J. E. Ellor (Rolls Royce) referred to British experience which showed that interchangeability of air and liquid-cooled engines was not only possible, but practical if the integral system was adopted. Especially in the case of wing nacelles, concessions on cross-section of the bulkhead size was surprisingly little. According to Ellor, the integral power plant can be used to great advantage for the heavier types of multi-engined aircraft.

In his final reply, the author agreed that the integral power plant was ruled out for single-engined aircraft, but hoped that its other possible applications would receive serious attention.

Alloy Steel Castings, Their Properties and Field of Application. (H. Juretzek, Giesserei, Vol. 29, 1942, pp. 217-226 and 243-249.) (110/8970 Germany.)

Alloy cast steels differ in their properties and composition, depending on their special field of application. The author distinguishes the following five classes of utilisation :—

1. General engineering construction, including transport vehicles and aircraft.
2. Steam boilers, turbines and other parts subjected to combined thermal and mechanical stress (chemical industry and synthetic fuel production).
3. Cast tools.
4. Parts requiring high resistance to corrosion, heat and wear.
5. Cast steel magnets.

Some representative types of casting alloy in each case are given below, with the exception of (5), the reader being referred to an article in Tech. Milt. Krupp., 1941, pp. 1-15, for this class of material.

1. The alloy steel most frequently used in Germany has the following app. composition :—

C.	...	...	0.26%
Cr.	...	...	1.0%
Mo.	...	...	0.2%
Mn.	...	...	0.8%
Va.	...	...	0.1%

Depending on heat treatment, ultimate tensile ranging from about 70 to 125 kg./mm.^{2} can be obtained (44 to 79 tons/sq. in.). The elongation and impact strength over the same range vary from 20-10 per cent. and 18-5 kg. m./cm.^{2} respectively.

Provided that the casting and heat treatment have been carried out correctly, all parts of the steel casting will have the specified strength and the designer can thus count on having a material with properties equal to those of rolled or forged steel without having to worry about direction of grain.

It is interesting to note that whilst the absolute fatigue strength of the casting is slightly lower than that of a forging of same ultimate strength (strength factor 0.4 against 0.45 to 0.5 for the forging), the notch sensitivity is considerably less (strength factor 0.37 against 0.26 for the forging).

Especially marked is the beneficial effect of shot blasting which leads to an improvement of at least 10 per cent. in the fatigue strength of the casting. In judging fatigue strength, the shape of the whole part must be taken into account and a heat treated casting will always be superior to a forging with welded-on parts.

2. The important properties of this class of castings are a high hot elastic limit and creep strength. This is generally achieved by using a relatively high Mo. content (0.5-1 per cent.). Cr. (up to 16 per cent.) is added if corrosion resistance at high temperature is also required.

Guaranteed minimum creep values of 20 kg./mm.^{2} at 650°C. and 10 kg./mm.^{2} at 700°C. can be easily reached with suitable alloys.

3. Cast steel tools are chiefly used for processes involving hot working (mandrels, hot rolls, pressing and drop forging dies).

The chief requirements are high resistance to wear, high toughness and insensitivity to temperature changes. Mn.-Cr.-Mo. alloys with or without Va. are employed, with carbon content of about 0.2 per cent. (pressing dies have a carbon content of up to 0.5 per cent.).

4. Generally speaking, the minimum Cr. contents of stainless and acid resisting cast steels is of the order of 14 per cent., but may go up to 32 per cent. Cr. may be the only alloying constituent, but Cr.-Ni. or Cr.-Mn. combinations are also used.

It is interesting to note that these alloys have a much greater cavitation resistance than bronze and have been extensively employed for pump impellers. As is well known, sliding contact of stainless steels is apt to cause frettage corrosion. A high carbon chromium steel in the cast condition, on the other hand, will have good sliding properties (ledeburite structure) and is widely employed in high pressure pump mechanism.

Cr.-Ni. cast steel can also be welded without subsequent heat treatment. In order to conserve Cr. it has been found possible to impart corrosion resistance to a low alloy steel casting by surface diffusion of Cr. (outer layer 1 mm. thick will contain over 30 per cent. Cr.).

In conclusion the author emphasises the great progress that has been made in casting technique as illustrated by a series of photographs of representative samples. It is now possible to obtain a wall thickness equal to or only slightly thicker than that of an equivalent bronze casting.

Gang Riveting—a New Method of Riveting Employed by Curtiss-Wright Corporation. (Curtiss Fly Leaf, Vol. 25, No. 4, Sept.-Oct., 1942, p. 19.) (110/8969 U.S.A.)

An important new short-cut in riveting the thin aluminium skin covering on Curtiss Helldiver dive-bombers and Seagull scouting planes has been developed at the Ohio plant of the Curtiss-Wright Corporation. It is claimed that this new method of riveting has reduced the number of hours required for the operation by 70 per cent.

Formerly each rivet was installed in a separate operation. A single rivet was placed in its hole. One employee operated the rivet gun; a second acted as "bucker." Because the operation was done by hand, many times rivets were driven in non-uniformly and had to be re-worked or again the skin was "ringed" by the incorrect angle of the rivet gun, making it necessary to replace the entire skin section. The new system employs a "gang riveter" which can drive up to nine rivets in a single operation. Instead of holding up a fuselage fixture on the assembly lines until the skin has been applied, the thin aluminium covering is now assembled on a bench. The fixture is free to move down the line for other operations which formerly had to wait. When it is completed, the skin is then installed on the fuselage in a large section rather than piece by piece. Gang riveting has also eliminated "ringing" of the skin due to the uniform operation angle of the gang riveter.

Systematic Tests on the Suitability of Bearing Materials. (E. Heidebrock, A.T.Z., Vol. 45, No. 24, 25/12/42, pp. 652-656.) (110/8762 Germany.)

If hydrodynamic lubrication could be assured under all circumstances, the nature of the materials employed for journal and bearing would not effect the friction which would only depend on the viscosity of the oil employed. Whilst this type of lubrication can generally be assured under conditions of high shaft speeds and low loads, the opposite condition of operations lead to such small film thicknesses that molecular surface forces intervene and the friction is now no longer a function of the viscosity only, but depends on the nature of the surfaces and the chemical constitution of the oil. This condition of so-called

boundary lubrication is also accompanied by wear and may ultimately lead to seizure (welding of small particles).

Boundary lubrication cannot be avoided when starting up from rest or when the journal speed oscillates about a zero value.

Tests at low speeds are thus of special value in determining the ultimate capacity of the bearing and the author has developed a special test machine in which the changes in journal friction are recorded optically by means of a sensitive spring balance, the speed of rotation being as low as 0.1 mm. sec.

By employing a journal diameter of only 6 mm., and loads between 1-8 kg./cm.^{2}, the original surface finish could be maintained over long periods (no running in) and the consistency of the experiments increased (steady oil film temperature).

For any bearing combination and given load, it is possible to specify a minimum speed of operation, below which the friction, as recorded on the film, becomes very unsteady and shows high peak values. It is assumed that these coincide with the breakdown of hydrodynamic lubrication and the development of boundary conditions.

A classification of bearing materials on the basis of n minimum as given by the tests thus gives an indication of their relative behaviour under these very arduous conditions. An alternative method of classification adopted by the author consists in determining the maximum load which the bearing will carry continuously at a given speed without the oil film temperature exceeding a certain amount.

Generally speaking, the order of merit of a series of bearing materials is not the same in the two classifications, showing that emergency running qualities (low n min.) are not usually associated with high load capacity under more normal conditions of operation.

In conclusion, the author expresses the hope that further tests of the types described will ultimately lead to the elimination of a large number of " replacement " alloys at present being manufactured and the concentration on a few groups which offer possibilities of being the equal of standard materials at present in short supply in Germany.

Application of Supersonics in Metallurgy. (A.T.Z., Vol. 45, No. 24, 25/12/42, p. 668.) (110/8766 Germany.)

Tinned Al. sheet has the advantage that it can be soft soldered. Unfortunately, under normal conditions, it is very difficult to obtain proper adhesion of the tin, since the oxide film on the Al. acts as a barrier. According to the author, this oxide film can be removed and proper anchoring of the tin achieved if the Al. sheet whilst immersed in the bath of molten tin is subjected to high frequency vibration by contacting it with a supersonic generator. A suitable generator of this type consists of a nickel iron tube magnetised by a high frequency current termed to be in resonance with a harmonic of the natural longitudinal frequency of the tube. The tube being only a few centimetres long, frequencies of the order of 1,200 m./sec. are generated.

The velocity of propagation of the sound waves in the molten zinc bath is of the order of 1,200 m./sec. and the Al. sheet in contact with the supersonic generator subjects the contacting zinc particles to very large acceleration and decelerations ($\sim$ 100 g.).

Under these conditions the oxide film is rapidly destroyed and a firm anchoring of the zinc in the aluminium is assured.

The intensity of the sound waves emitted by supersonic generators is very large and may amount to 10 watts/cm.^{2}. (Sound intensity of gun fire 0.001 watts/cm.^{2}.) On account of the small wave length, this implies pressure jumps of the order of 10 atmospherics per mm. and accounts for the high acceleration of the zinc particles referred to above.

The pressure effect of supersonic waves has also been employed to produce finer grain in castings, the melt being exposed to supersonic radiations during solidification and this producing a breaking up of the crystals. Another interesting application of supersonic pressure effects is in the production of a self-lubricating bronze containing about 25 per cent. graphite. Under the action of supersonic radiation, the graphite is finely dispersed in the molten bronze and a homogeneous mixture results. Without such aids, it would be impossible to obtain a satisfactory mixture of the light graphite with the heavy metal.

The Lubrication of Gear Wheels with Special Reference to conditions of Boundary Lubrication. (E. Pietsch, A.T.Z., Vol. 46, No. 1, 10/1/43, pp. 12-14.) (110/8759 Germany.)

A special mechanism has been designed which enables a direct optical record of the tangential friction force on the tooth flank being recorded whilst the gear is transmitting load.

It appears that the coefficient of friction is not affected very much by the degree of finish of the flank (superfinish 10 per cent. lower than normal grinding) but depends markedly on the type of oil employed.

It is interesting to note that since the direction of the friction force reverses at the point of rolling contact a smoother dive results if each of the gear wheels is made double, the two wheels of a unit being displaced relatively to each other by a fraction of the pitch. In order to compensate for unavoidable differences in manufacture, the two halves are not bolted rigidly, but spring coupled. In this way it can be ensured that the load is divided equally and oscillogram records given by the author show conclusively that the friction impulses transmitted to the shaft can be considerably reduced under these conditions, and a very steady drive obtained. Such gears are very suitable for determining the " life " of the lubricant, *i.e.*, the probable running time before a definite amount of oil previously brushed on to the teeth is used up and a marked increase in friction is shown on the record (boundary lubrication).

It is possible to grade oils consistently by this method and some synthetic oils tested by the author proved definitely superior to standard mineral oil.

There appears to be no consistent relationship between viscosity and " life " of the lubricant. Synthetic oils of high viscosity however often show up very well in these tests and the author has devised a special method of feeding such oils to the gears. The oil is introduced to the base of the tooth gap through channels which either communicate with an oil passage in the shaft or with pockets in the gear wheel supplied by a drip feed. The oil is flung out by centrifugal action causing an effective lubrication of the tooth flank. Since the quantity of oil circulated by this method is very small, it may be necessary to incorporate special additional cooling devices on the wheel.

Apart from tests on actual gear wheels, the author has also devised a laboratory instrument for grading oils under condition of boundary lubrication. This simple instrument essentially consists of two flat plates enclosing a very thin film of oil. Under these conditions the plates adhere together and will only separate after a certain time interval when subjected to pulling or shearing forces. It appears that the product force time for separation is constant for a given oil and plate material and bears some relation to the life of the oil as determined from the gear wheel testing machine. It is evident that the boundary film can withstand considerable forces for a short interval of time. If the force, however, exceeds a certain value, the adhesion of the oil is overcome and this may lead to particles of metal being torn out of the surfaces of the process if repeated often enough.

This would account for the peculiar fitting observed on gear wheels and could be reproduced by means of the plate testing machine after about 2×10^6 reversals.

Strength Characteristics of Plastic Bonded Plywood. (G. R. Parsons, Trans. A.S.M.E., Vol. 65, No. 1, Jan., 1943, pp. 1-7.) (110/9032 U.S.A.)

New methods of moulding plywood by the bag process, combined with new adhesives, have opened a wide range of possibilities for the use of plywood in aircraft construction. This paper explains some of the more important advantages of plastic-bonded plywood and presents some of the pertinent basis-strength characteristics. The prediction is made that in the near future with gluing technique advancing rapidly, a thin metal covering glued to a plywood core will be used to great advantage in aeroplanes having high wing loadings. Such construction will combine the high axial strengths of the metals with the good buckling characteristics of the thicker plywood construction.

The author has prepared the following table to compare the basic-strength values of plastic-bonded plywood with those of other materials popular in aircraft manufacture.

Material	Specific Gravity.	Thickness, in.	Allowable Loads. Tension, lb. per in. width.	Block compression, lb. per in. width.	Shear, lb. per in. width.	*EI*
24 ST. Al. alloy	2.77	0.052	3200	3200	1924	120.7
24 SRT. Al. alloy	2.77	0.052	3380	3380	2030	120.7
1025 Steel	7.85	0.019	1045	1045	666	16.0
4130 Steel	7.85	0.019	1810	1810	1045	16.6
Magnesium alloy	1.80	0.080	2560	2560	1530	277.3
Spruce	0.40	0.358	3650	2010	412	5230.0
Plywood:—						
Birch face, Poplar core	0.66	0.205	1918	1304	460*a*	1488.6
Mahog. face, Poplar core	0.58	0.247	1738	956	550*a*	1598.4

a Estimated.

NOTE.—The plywood panels are constructed of either birch or African mahogany face veneers of 1/20 and longitudinal grain direction, and having five and seven, respectively, yellow poplar veneers of 1/48 between the faces. These poplar veneers have the outside veneer longitudinal, and then successive veneers have grain directions at right angles.

The table is based upon unit width of material and is so arranged that the density multiplied by the thickness remains a constant. In aircraft construction, the design criterion is usually one of buckling which is dependent upon the *EI* or stiffness value of the panel under consideration. It is because of this buckling phenomenon that in thin-metal construction, stringers and stiffeners must be added throughout to increase the effective width of sheet capable of carrying compressive loads. Although this addition of stringers and stiffeners strengthens the sheet and makes it capable of carrying the load applied, anyone who has ever done any flying will vouch for the fact that wrinkles are still very much in evidence. To avoid these wrinkles which are evidently harmful to airfoil shapes and laminar-flow characteristics requires a construction in thin metal which is heavy, costly, and quite impractical. Plywood, on the other hand, having such a high value of stiffness factor *EI* and allowing the use of a much thicker section has no tendency toward wrinkling and can with comparative ease be designed to prevent buckling from occurring.

It has been demonstrated in a series of tests conducted by the author's company that plywood has the ability to carry appreciable loads after buckling. Since all aeroplanes are designed to carry a 50 per cent. overload, it is possible to design plywood wings to avoid buckling up to the loading of any normal flight condition and to allow buckling to occur safely above this load. This factor, combined

with the fact that there are no rivet heads or skin laps to interfere with air flow, greatly enhances its application in high speed aeroplanes. Since the elastic limit is very near the ultimate in wood, the advantage of having elastic deformation for any normal flight loads is apparent.

Contrary to public opinion, plywood fabricated with the resinous products used to-day has a greater resistance to fire than has an equal weight aluminium-alloy part. This is especially true when in the presence of flaming oil gasoline.

The added advantage of having bullets leave clean holes in plywood and the ability to repair with ease such holes makes this material especially attractive in the present crisis.

Single or Double Hardening for Motor Car Transmission Gear Wheels Made of Case Hardened Steel. (H. Glaubitz, A.T.Z., Vol. 46, No. 1, 10/1/43, pp. 9-12.) (110/8758 Germany.)

Double hardening for gear wheels, as its name implies, consists of a process involving two quenches, a typical treatment for a case hardening steel being as follows:—

Case hardening	927°C.
Cool to	871°C.
1st Quench in oil, reheat to ...	805°C.
2nd Quench in oil, temper to ...	155°C.

It has been claimed that this process is essential in order to obtain a sufficiently firm grain structure both of the case hardened layer and the internal core.

In the manufacture of gear wheels, however, the double hardening process has proved very expensive on account of the greater risk of warping necessitating an increase in the amount of grinding required.

There is no doubt that single hardening would reduce warping troubles. The difficulty is, however, to provide sufficient hardness of the core without the risk of overheating the case and coarsening the grain structure of the latter unduly. (This may lead to embrittlement and must be avoided especially in gears.)

From German and American experiments it appears that satisfactory results can be obtained by the single hardening process for smaller wheels and relatively thin case (~/mm.) if the quenching temperature is dropped by about 40°C. below the normal (*i.e.*, 830 against 870°C.) great care must be taken that the parts are at a uniform temperature before quenching and the rate of cooling from the case hardening to the quenching temperature must also be accurately controlled. The exact heat treatment will vary with the type of steel employed and will have to be determined by experiment once the right temperature conditions have been determined, there will be no difficulty of reproducing the correct conditions, thanks to the excellent thermometric equipment of the modern metallurgist and the close conformity to specification of modern steels.

According to the author, it was lack of such equipment and variation in steel composition which led to the introduction of the less sensitive double hardening process about 20 years ago.

It appears that with some more research, rough hardening will also become general for larger wheels.

Bearing Strength of Plastics and Plywood. (J. Bond, Trans. A.S.M.E., Vol. 65, No. 1, Jan., 1943, pp. 9-14.) (110/9033 U.S.A.)

The specimens used in these tests were representative of commercially available high-impact moulded and laminated plastic sheets and resin-bonded birch plywood.

The testing was done in a Riehle 40,000 lb. testing machine, at room temperature, and the loads were applied and removed at a rate of 0.0529 in. per min.

The specimens were placed in a jig consisting essentially of two heavy metal plates separated by two spacer blocks. A plunger slides between the spacer blocks and impinges upon the top of the test specimen. This test specimen is held in place by a bearing pin which runs through the side plates and the specimen, and is constructed of $\frac{3}{8}$ in. ground and polished drill rod. In this jig, the part of the specimen above the bearing pin is compression-loaded when a force is applied to the plunger. The part of the specimen below the bearing pin is essentially unstressed and the deformation, attributable to bearing pressure is measured at this point through the use of multiplying lever. The multiplying lever has two purposes; *i.e.*, it places the Ames dial gauge in a more convenient place for reading, and it also multiplies the deformation so that less error will be made in reading small deformations. The multiplying lever used in these tests was 5 in. long. By means of this lever readings may be made directly to 0.0002 in. Deflections were not measured until the rapid initial deformation had occurred in the test specimens (0.5 to 1 min.). The test jig was accurately centred between the crossheads of the testing machine so that the load would not be applied eccentrically.

Two main types of test were run, *i.e.*, load versus deformation and load versus permanent set. Curves were plotted for load versus deformation in per cent. of bearing-pin diameter, and load versus permanent set in per cent. of bearing-pin diameter.

Three sets of test specimens were used: One set was conditioned in a desiccator at 55 per cent. relative humidity for 96 hr.; one set was immersed in water at room temperature of approximately 70°F. for 96 hr.; and one set was placed in a drying oven in which the temperature was maintained at approximately 160°F. for 96 hr. The main tests were done at 55 per cent. relative humidity, and the other two tests were run to determine the effect of extremes in temperature and moisture upon the bearing strength of the specimen.

The plywoods were definitely inferior to the reinforced plastics in bearing strength. In nearly all cases heating improved the bearing strength of the specimens and soaking in water decreased their bearing strength, as compared to that observed for the specimens conditioned at room temperature and a relative humidity of 55 per cent.

The proposed load versus deformation (4 per cent. of bearing-pin diameter) test gave much more satisfactory results than did the proposed load versus permanent set (0.2 per cent. of bearing-pin diameter) test and, in addition, was easier to perform. For these two reasons the former test is the more desirable.

Application and Unusual Physical Properties of Synthetic Rubbers. (O. D. Cole, Trans. A.S.M.E., Vol. 65, No. 1, Jan., 1943, pp. 15-20.) (110/9034 U.S.A.)

This paper deals with some of the applications and more or less unusual physical properties of several of the commercial rubber-like synthetic materials on the market or in advanced stages of development at the present time. The materials which are considered as " synthetic rubbers " fall into four classes: (*a*) Buna S types or copolymers of butadiene and styrene; (*b*) Buna N types, or copolymers of butadiene and acrylonitrile; (*c*) Neoprenes, or polychloroprenes, or copolymers of chloroprene with other materials; and (*d*) Butyl rubber, a copolymer of isobutylene and butadiene. The Thiokols or organic polysulphide polymers might be included among the " synthetic rubbers " by some, but, although they appear to be vulcanisable, their thermo-plasticity makes them useful only to a limited degree in places where elasticity and other rubber-like properties at higher temperatures are desired. Details concerning Buna S type polymer, adopted by the Rubber Reserve Company for use in tyres and as a general purpose rubber, are discussed. Some interesting data on the efficiencies of

various synthetic rubber compounds as compared to those of natural rubber compounds at high and low temperatures are shown. Data are also given which indicate that the proper choice of plasticiser is important for compounds to be used for oil-resistant gaskets, sealing rings, and the like.

The Buna S types can be used in nearly all cases to replace natural rubber. Generally satisfactory service as compared to natural rubber has been observed in the case of passenger car tyres. However, it must be pointed out that, with this or any synthetic rubber, as in the case of any new material, certain difficulties are present and must be overcome. For example, truck and heavy duty tyres at present are the result of years of specialised engineering and design, based on the characteristics of natural rubber. In order to meet the service conditions encountered to-day, it may be that some radical departure from present thinking and designs may have to be made in order to fit synthetic rubber into the picture. It is sufficient to say that the Buna S types appear to fit more nearly into the scheme of thinks as we see them to-day than any of the other synthetic rubbers.

The Buna N types of synthetic rubbers are being recommended for all types of mechanical goods such as hose, packings, gaskets, rollers, etc., wherever high resistance to ageing, oils and hydrocarbon solvents is desired.

The Neoprene types are used wherever moderate oil resistance and good resistance to ozone and sunlight are desired. Since it will not support combustion it is widely used as a flameproof, oilproof, wire insulation.

Butyl rubber can best be utilised where its inherent properties of chemical stability, resistance to ozone, light and high impermeability to gases can be used to best advantage. As has been pointed out no entirely satisfactory tyres have as yet been made from Butyl rubber.

One of the major problems which is not stressed in the discussions of synthetic rubber in the press is that of processing. It has been said that synthetic rubbers process just like natural rubber on regular rubber machinery. On the contrary, however, each material behaves differently and, although the difficulties are not insurmountable, even the training of personnel to handle each new material involves considerable time and effort.

Neoprene GN and some of the Buna N types have been found to give results in tyre tread wear tests equal to, or better than, those given by natural rubber. However, several major difficulties in processing and fabrication have caused the trend toward a Buna S type for tyre rubber.

Many of the really serious problems of to-day may be problems only because of the fact that certain handling processes designed for natural rubber are not fundamentally correct for the synthetic rubbers used. Because of this, it is possible that in the future the rubber industry will depend more than ever upon the mechanical engineer for the solution of its processing and handling problems.

Automatic Uniform Rolling-in of Small Tubes. (F. F. Fisher and E. T. Cope, Trans. A.S.M.E., Vol. 65, No. 1, Jan., 1943, pp. 53-60.) (110/9037 U.S.A.)

The author reviews some of the current methods of rolling-in small tubes such as are used in surface condensers, feedwater heaters, air and oil coolers, and air heaters, pointing out the shortcomings of each method. It emphasises the fact that no operator who undertakes to roll-in joints by any of these methods must be well trained and must possess considerable skill in using the expander tool. Yet, even in the hands of the most expert operator, uniform joints of optimum rolling cannot be assured. The elongation incident to rolling is always present, as is also the resulting condition of axial loading of the tube which produces complex loading and deformation of the tube sheets. A carefully planned

sequence of rolling must be applied in order to distribute this loading in such a manner that the tube failures may be avoided.

An entirely new technique of rolling-in tubes is described. This employs the familiar tools with the addition of appropriate thrust collars. The tool is entered to its full depth into the tube at the beginning of the operation and the current-limiting relay automatically stops the rolling by shutting off the current to the motor when the joint has been expanded by the correct amount as determined previously by laboratory tests on sample joints. This relay is not in the circuit during the starting of the motor or during the backing out of the tool, a very important new development. In this technique the elongation is compensated for in whole or in part by the stretching of the tube during the first stage of the operation, that in which the tube end is enlarged to fit the tube hole.

Requirements for Carburettor Air Filters for Aero Engines. (W. D. Cannon, J.S.A.E., Vol. 51, Feb., 1943, pp. 33-37, 63.) (110/9039 U.S.A.)

The advent of desert warfare has necessitated the use of air filters for aero engines. Air filters already form standard equipment on tractors and automobiles operating in sandy regions of the U.S.A. and on account of the experience gained in this way, it proved relatively easy for the American industry to develop a suitable form of filter for aircraft use. Such a filter must be light and strong, easy to instal, offer minimum obstruction to the air flow and retain its effectiveness over a reasonable period. These requirements are best met by filters of the viscous infringement type, the elements being in the form of knit wire or knit metal ribbon sheets suitably crimped and packed. The mesh of the sheet becomes progressively smaller from the entering face to the rear, and the supports are sufficiently strong to withstand engine backfires. The thickness of the element has been standardised at 2 in. The filter is dipped in engine oil and allowed to drain before installation. This oil traps and holds the sand separated mechanically by the mesh, and if properly installed such a filter will remove 90 per cent. of the sand at a pressure drop of about 4 inches of water, the air speed being 1,000 feet per minute. In all installations, except those fitted with exhaust driven supercharger, the filter is mounted close to the entry of the air scoop and thus precedes both the carburettor and supercharger. The filter is usually inclined to the airstream at an angle of about 30° so as to obtain sufficient filtering area without over-dimensioning the scoop.

Just ahead of the filter ejection slots are provided which bleed off some air which carries with it accumulated dirt and water.

Prior to entering the carburettor, the inductor manifold is usually fitted with an alternative hot air intake (air heated by exhaust manifold) and this in its turn is fitted with a further valve enabling warm air to be taken from the space behind the engine. These alternative air intakes are not provided with filters as they are only used under conditions when sand is not likely to be present in damaging quantities.

As already stated above, in the case of exhaust turbo supercharging systems, the filter is not placed inside the airscoop but on the pressure side of the turbo compressor between intercooler and carburettor. This location was found to have least effect on the functioning of the system.

Typical desert sand consists mainly of silica, the particles ranging in size from 0.05 to 0.0005 inches. About 50 per cent. can be washed out in the standard clay test and of the remainder about 40 per cent. are small enough to be retained by the U.S. standard screen No. 325.

The author makes some reference to the British Vokes filter (accordion pleated wire mesh—no by pass) whilst a captured German filter as fitted to the Me. 109 is described in detail. This filter consists of a cylindrical tube projecting about

12 inches beyond the leading edge of the wing. This tube is clear of internal obstructions and when the front is open will act as a normal intake. On closing the front with a shutter, the air is forced to enter through lateral holes in the cylinder wall and pass through a lining consisting of six layers of crimped dural sheet. These are arranged in such a manner as to cause frequent changes in air direction. The filter is of the dry type and is not considered satisfactory.

A Fully Automatic Fuel Flow Meter (Calibrated Tank Type). (V. Schmidt, A.T.Z., Vol. 45, No. 27, 25/12/42, pp. 670-672.) (110/8767 Germany.)

Fuel flow meters of the calibrated tank type which enable the observer to measure the time taken for the consumption of a given volume or weight of fuel are well known and especially suited for consumption measurements at small rates of flow. They suffer, however, from the defect that several taps have to be operated and the operation of the stop watch require a certain amount of skill. In the new instrument, the observer eye is replaced by a photocell and the liquid in the gauge tube provided with a small opaque float. The electrical circuit is arranged so that on pressing a button, the necessary taps are operated electrically and a stop watch started and stopped as the liquid passes the higher and lower gauge mark respectively. The taps are then reset so that the calibrated tank refills and the instrument is ready for another reading. An engine revolution counter is incorporated so that the total number of revolutions corresponding to the fuel tine are recorded automatically.

By employing calibrated tanks of various sizes, rates of fuel flow from 0.75 *l/h* to 2,000 *l/h* can be measured to an overall accuracy of about 0.3 per cent.

What are the Results of Freezing the Electrolyte in Accumulator Batteries. (E. Bleich, A.T.Z., Vol. 45, No. 23, 10/12/42, pp. 641-645.) (110/8764 Germany.)

The freezing point of the electrolyte depends on its density and varies from about $-10°C.$ ($D=1.13$) to $-65°C.$ ($D=1.285$). The latter value corresponds to the fully charged condition and such a battery is evidently immune to freezing even in a severe Russian winter ($-50°C.$).

Discharge of the battery is accompanied by a drop in density of the electrolyte and at $\Delta=1.20$ the freezing point is about $-25°C.$ As a consequence batteries froze regularly during the winter campaign in Russia unless specially protected.

Freezing as such is not harmful to the plates and there is no danger of the battery bursting, even if the density of the electrolyte is as low as 1.02 and the temperature $-40°C.$ This is due to the fact that complete solidification never occurs, a certain amount of liquid slush always remaining and acting as a safety valve (alcohol-water mixture exhibit similar characteristic on freezing).

Reported cases of damage were probably due to careless handling of the battery, the container especially becoming brittle when exposed to severe cold.

A cold or frozen battery has a very high internal resistance and as a result the terminal voltage falls considerably when passing large currents. Under normal conditions (20°C.) a 6V75 AL battery will pass 300 amp. at 5 V. for a few seconds, irrespective of whether the battery was originally fully charged or had already half run down. At $-40°C.$, however, the passage of 300 amps. causes a voltage drop to 2.75 and 1.5 volt respectively, depending on whether the battery had been fully charged or half discharged respectively. The extra drop in the latter case is due to the partial freezing of the electrolyte, the fully charged battery still remaining liquid at $-40°C.$

In this connection it should be remembered that the increase in internal resistance with cold effectively counteracts the normal tendency of self discharge

and provided the battery was in reasonable condition before freezing, a simple warming to 20°C. should therefore suffice to render it again workable.

Under no circumstances should a cold or frozen battery be charged electrically without such previous warming. It appears that the passage of the current at very low temperatures is no longer accompanied by marked chemical changes of the plates but simply electrolyses the remaining liquid. Under these conditions excessive frothing takes place which will infallibly lead to corrosion troubles.

In addition, plugs of frozen electrolyte may prevent the free discharge of the gas and the pressure built up may distort or even burst the cell casing.

Influence of Type of Dust on the Performance of Air Filters. (U. Schmidt, Z.V.D.I., Vol. 85, No. 39-40, 4/10/41, p. 800.) (R.T.P. Translation No. 1,755.) (110/29668 Germany.)

The author describes the results of experiments on the resistance and efficiency of air filters of the oil-moistened type.

A constant rate of air supply containing a definite proportion of dust was maintained to the filter, the weight of dust extracted being determined periodically. The ratio of the weight extracted to the total weight admitted determines the efficiency of the filter at any instant. The resistance of the filter (mm. water) was also measured periodically and plotted on a basis of weight of dust extracted.

No details of the type of filter employed are given. The rate of dust admission was of the order of 4 gm. in 24 hours. The efficiency of the filter was of the order of 87 per cent. after one hour's operation and the initial resistance 5 mm. of water.

The experiments showed that the variation of resistance and efficiency with time of operation depend markedly on the type of dust employed (same weight concentration of dust in increasing air).

Most of the tests were carried out with flue ash recovered electrotatically from an electric generating station. This dust was available in large quantities and was characterised by great regularity of the particles (average size about 0.08 mm.). This dust consists mainly of hollow spheres of slag and is of relatively low density.

Comparison tests were also made with road dust with an average particle size of the same order. In this case, however, the particles are much more irregular and of greater density than flue ash.

For the same dust content of the air on a weight basis, the number of flue ash particles is thus greater and on account of their spherical nature, close packing is prevented. The hollow spaces absorb a considerable amount of oil which is thus withdrawn from the filtering circuit and as a result the efficiency of the oil-moistened filter diminishes much more rapidly in the case of flue ash than if road dust is used. Similarly the resistance of the filter plotted on a basis of weight of dust extracted increases more rapidly in the case of flue ash.

From the above it appears that it is essential for the filter to be tested with the type of dust occurring in practice before any opinion as to its performance can be expressed.

Experiments with Piezo Electric Pressure Indicators. (P. Hackemann and others, Z.G.S.S., Vol. 36, No. 9, pp. 187-190, and Vol. 37, No. 4, pp. 68-71.) (110/3545 Germany.)

It appears that the piezo electric indicator commonly used for measuring gas pressures in guns is subject to a number of errors. The layout of this instrument

follows that of the well known crusher manometer, the quartz crystal interposed between the piston and set screw taking the place of the buckled cylinder.

As it is essential that the quartz and piston maintain close contact under conditions of variable gas pressure, the quartz must be subjected to an appreciable preliminary compression by tightening the screw. As a result, the calibration of the instrument, *i.e.*, load/deflection shows a distinct kink which roughly corresponds to the point where the piston is lifted off its seating against the control force. Since the compressibility of the control-screw casing system is small, the first part of the calibration curve is much flatter than the rest of the curve for which the piston transmits the full load to the quartz. The early stages of the pressure rise are thus difficult to determine, the calibration moreover depending on the amount of preliminary compression. The difficulty can be overcome by incorporating a slotted tubular spring between the piston and the fixed quartz abutment. Such a spring can easily be designed to subject the combination to a relatively large preliminary compression whilst still having a much greater flexibility than that of the quartz-housing system.

Under these conditions, the calibration line no longer shows a kink and is independent of the actual amount of precompression over wide limits. Sample records of gas pressure in guns taken with a piezo electric indicator of the old type and as modified by the author show the great improvement obtained.

In conclusion, it should be pointed out that the inclusion of an internal control spring into the piston/quartz system is common practice in piezo electric recorders used as engine indicators.

The novelty of the author's design consists in the very compact arrangement adopted, enabling the instrument to be screwed directly into service barrels as small as 20 mm. calibre.

Abstractor's Note.—For experimental determination of the natural frequency of such instruments, see V.D.I. Forschungshaft 407.

A Survey of Selection and Allocation for Engineering Occupations. (F. Holliday, Journal of the Institution of Production Engineers, Vol. 22, No. 3, March, 1943, pp. 103-136.) (110/8971 Great Britain.)

The demands of the armed forces and industry for men for jobs of an engineering nature necessarily exceeds the number of recruits who have had engineering experience. The problem of picking out from those who have had no engineering experience candidates suitable for training has brought to the fore the importance of devising intelligence and aptitude tests. Considerable work in this direction has been carried out since the large scale intelligence testing was first introduced in the American army during the last war and is reviewed in this paper.

The psychological test is now generally adopted as a means of selecting trainees for technical training in various branches of the armed forces but has not found widespread use in industry. The saving that can be effected in both time and money by eliminating at the source the unfit and inapt cannot be overestimated. In investigations carried out by the author no less than 17 per cent. of a substantial number of pupil apprentices volunteered the information that they felt quite unfitted to be engineers. The author calculates that of a company's wage bill of £400,000, some £20,000 is wasted as a result of inefficient selection of workers and unsuitable allocation of work.

The author cites numerous illustrations of the beneficial results obtained by suitable psychological tests. In the Philips' Electric Lamp Works as much as 50 per cent. of the workers in the diamond-piercing department, after under-

going 1-2 years training, costing the firm on an average £250 per head, were found to be incompetent. After the introduction of the tests this percentage fell to 12½ per cent.

The author concludes by stressing the importance of extending facilities for training personnel in basic psychology, occupational analysis, the use of psychological tests and the interpretation of test scores and the need to appoint men so trained to industry.

TITLES AND REFERENCES OF ARTICLES AND PAPERS SELECTED FROM PUBLICATIONS REVIEWED IN R.T.P.3.

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17	7900	G.B.	*Fighter Design.* (Flight, Vol. 43, No. 1,779, 28/1/43, pp. 89-92.)
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73	7842	U.S.A.	... *Flying Fortress.* (P. G. Masefield, Aeroplane, Vol. 64, No. 1,653, p. 125.)
74	7850	U.S.A.	... *North American "Mitchell" (Photo).* (Flight, Vol. 43, No. 1,778, 21/1/43, p. 80.)
75	7852	U.S.A.	... *Lockheed "Ventura" (Photograph).* (Flight, Vol. 43, No. 1,778, 21/1/43, p. 76.)
76	7858	U.S.A.	... *Curtiss "Seagull" (Recog. Details).* (Flight, Vol. 43, No. 1,778, 21/1/43, p. b.)
77	7901	U.S.A.	... *Douglas B. 19 (Ident. Details).* (Flight, Vol. 43, No. 1,779, 28/1/43, p. a.)
78	7909	U.S.A.	... *New Curtiss Dive Bomber A-25.* (Flight, Vol. 43, No. 1,780, 4/2/43, p. 114.)
79	7917	U.S.A.	... *Grumman "Martlet" on Carrier Deck (Photo).* (Flight, Vol. 43, No. 1,782, 18/2/43, p. 164.)
80	7918	U.S.A.	... *Curtiss Dive Bomber A-25 (Photo).* (Flight, Vol. 43, No. 1,782, 18/2/43, p. 165.)
81	7925	U.S.A.	... *Vultee Vanguard Fighter (Recog. Details).* (Flight, Vol. 43, No. 1,782, 18/2/43, p. a.)
82	7926	U.S.A.	... *Brewster Buffalo (Recog. Details).* (Flight, Vol. 43, No. 1,782, 18/2/43, p. b.)
83	7947	U.S.A.	... *American Aeroplanes in Service (Drawings and Specifications).* (Aeroplane, Vol. 64, No. 1,654, 5/2/43, pp. 158-159.)
84	7949	U.S.A.	.. *North American Mitchell I (Photo).* (Aeroplane, Vol. 64, No. 1,655, 12/2/43, p. 172.)
85	7954	U.S.A.	.. *Vought-Sikorsky "Corsair" (Recog. Details).* (Aeroplane, Vol. 64, No. 1,655, 12/2/43, p. 192.)
86	7972	U.S.A.	.. *Curtiss A-25 Dive Bomber "Banshee" (Photo).* (Aeroplane, Vol. 64, No. 1,656, 19/2/43, p. 206.)
87	7974	U.S.A.	... *The Lockheed "Vega Ventura."* (Aeroplane, Vol. 64, No. 1,656, 19/2/43, pp. 214-215.)
88	7977	U.S.A.	... *American Aeroplanes in Service (IV) (Silhouettes of Douglas, North American, Consolidated Martin).* (Aeroplane, Vol. 64, No. 1,656, 19/2/43, p. 227.)
89	8124	U.S.A.	... *Consolidated Coronado II (Recog. Details).* (Flight, Vol. 43, No. 1,777, 14/1/43, p. a.)
90	8126	U.S.A.	... *The Stearman (American Biplane Trainer).* (Flight, Vol. 43, No. 1777, 14/1/43, pp. 41-43.)
91	8132	U.S.A.	... *Grumman Avenger Dropping Torpedo (Photo).* (Flight, Vol. 43, No. 1,777, 14/1/43, p. 31.)
			Military Types (Germany).
92	6908	Germany	... *Focke Wulf F.W. 190A (Sect. Drawing).* (Autom. Ind., Vol. 87, No. 10, 15/11/42, pp. 26-27.)

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93	7622	Germany	...	*Junkers Ju.* 87*D Dive Bomber.* (Inter. Avia., No. 844-845, 21/11/42, pp. 11 and 17.)
94	7623	Germany	...	*Bloch* 157 (*Fighter*) *and Bloch* 175 (*Torpedo Bomber*). (Inter. Avia., No. 844-845, 21/11/42, p. 18.)
95	7776	Germany	...	*Focke Wulf* 190 *A*-3 *and Me.* 210 *A*-1 (*Design Details*). (Airc. Prod., Vol. 5, No. 53, March, 1943, pp. 144-146.)
96	7792	Germany	...	*Junkers Ju.* 286 (86*P*) *High Altitude Bomber.* (Inter. Avia., No. 843, 11/11/42, p. 22.)
97	7799	Germany	...	*Messerschmitt Me.* 210. (Inter. Avia., No. 843, 11/11/42, p. 23.)
98	7840	Germany	...	*Ju.* 90 *Latest Version* (*Ju.* 290 *Bomber*) (*Photo*). (Aeroplane, Vol. 64, No. 1,653, 29/1/43, p. 119.)
99	7841	Germany	...	*Focke Wulf* 190 *A*-3. (Aeroplane, Vol. 64, No. 1,653 29/1/43, pp. 122-124.)
100	7891	Germany	...	*War Planes of the Axis* (D. C. Cooke, Coast Artillery J., Vol. 85. No. 5, Sept.-Oct., 1942, pp. 4-11.)
101	7902	Germany	...	*Dornier Do.* 26 (*Ident. Details*). (Flight, Vol. 43, No. 1,779, 28/1/43, p. b.)
102	7904	Germany	...	*Focke Wulf* 190 *A*-3. (Flight, Vol. 43, No. 1,779, 28/1/43, pp. 99-100.)
103	7920	Germany	...	*Henschel Hs.* 129 (*Ground Attack*), *Two Silhouettes.* (Flight, Vol. 43, No. 1,782, 18/2/43, p. 167.)
104	7921	Germany	...	*Messerschmitt Me.* 109 *G*-2 (*Fighter*). (Flight, Vol. 43, No. 1,782, 18/2/43, p. 167.)
105	7922	Germany	...	*Ju.* 87 *D*-1 (*Dive Bomber*). (Flight, Vol. 43, No. 1,782, 18/2/43, p. 167.)
106	7929	Germany	...	*Messerschmitt* 210 *A*-1. (Flight, Vol. 43, No. 1,781, 11/2/43, pp. 143-146.)
107	7931	Germany	...	*Fieseler "Storch"* (*Recog. Details*). (Flight, Vol. 43, No. 1,781, 11/2/43, p. b.)
108	7956	Germany	...	*Messerschmitt Me.* 210 *A*-1. (Aeroplane, Vol. 64, No. 1,655, 12/2/43, pp. 194-197.)
109	7968	Germany	...	*Messerschmitt* 109 *G*-2. (Aeroplane, Vol. 64, No. 1,656,19/2/43, p. 203.)
110	7969	Germany	...	*Henschel Hs.* 129 *Ground Attack Aircraft.* (Aeroplane, Vol. 64, No. 1,656, 19/2/43, p. 203.)
111	7970	Germany	...	*Junkers* 87 *D*.1. (Aeroplane, Vol. 64, No. 1,656, 19/2/43, p. 203.)
112	8006	Germany	...	*F.W.* 190 *and its Engine* (*B.M.W.* 801). (Airc. Prod., Vol. 4, No. 47, Sept., 1942, pp. 566-567.)
113	8125	Germany	...	*Junkers Ju.* 90 (*Recog. Details*). (Flight, Vol. 43, No. 1,777, 14/1/43, p. b.)
				Military Types (*Italy*).
114	7843	Italy	...	*Fiat C.R.* 42 "*Freccia*" (*Recog. Details*). (Aeroplane, Vol. 64, No. 1,653, 29/1/43, p. 130.)
				Military Types (*Japan*).
115	6973	Japan	...	*Mitsubishi Zero Fighter* (*Photograph*). (U.S. Air Services, Vol. 27, No. 11, Nov., 1942, p. 15.)
116	7625	Japan	...	*Mitsubishi S-OO Fighter.* (Inter. Avia., No. 844-845, 21/11/42, p. 19.)

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117	7955	Japan ...	*Mitsubishi Navy S-OO (Recog. Details).* (Aeroplane, Vol. 64, No. 1,655, 12/2/43, p. 193.)
			Military Types (France).
118	7624	France ...	*Starck AS-20 Light Aeroplane.* (Inter. Avia., No. 844-845, 21/11/42, pp. II, 18-19.)
			Military Transport Planes.
119	6983	U.S.A. ...	*Martin Mars to be Converted to Cargo Transport.* ((Am. Av., Vol. 6, No. 14, 15/12/42, p. 9.)
120	7615	U.S.A. ...	*Martin P.B.M.-3 "Mariner" (Cargo Version).* (Inter. Avia., No. 844-845, 21/11/42, p. 13.)
121	7616	U.S.A. ...	*Curtiss C-76 Cargo Planes.* (Inter. Avia., No. 844-845, 21/11/42, p. 13.)
122	7617	U.S.A. ...	*Lockheed L-46 "Constellation" Cargo Plane.* (Inter. Avia., No. 844-845, 21/11/42, p. 13.)
123	7830	U.S.A. ...	*Lockheed "Constellation" (Transport).* (Flight, Vol. 43, No. 1,783, 25/2/43, pp. 198-201.)
124	7853	U.S.A. ...	*Curtiss Caravan Troop Carrier (Photo).* (Flight, Vol. 43, N o. 1,778, 21/1/43, p. 62.)
125	7859	Germany ...	*Modified Ju. 90 Transport (Photo).* (Flight, Vol. 43, No. 1,778, 21/1/43, p. 69.)
126	7860	Germany ...	*B.V. 222 45-Ton Flying Boat.* (Flight, Vol. 43, No. 1,778, 21/1/43, p. 69.)
127	7864	U.S.A. ...	*Curtiss-Wright C-76 Caravan Transport (Wood).* (Am. Av., Vol. 6, No. 15, 1/1/43, p. 44.)
128	7865	U.S.A. ...	*Curtiss-Wright Commando Transport (Photo).* (Am. Av., Vol. 6, No. 15, 1/1/43, p. 45.)
129	7903	U.S.A. ...	*Lockheed "Constellation" (Photo).* (Flight, Vol. 43, No. 1,779, 28/1/43, p. 98.)
130	7928	U.S.A. ...	*Lockheed "Constellation" Transport (Photo).* (Flight, Vol. 43, No. 1,781, 11/2/43, p. 141.)
131	7971	U.S.A. ...	*Douglas C.54 Transport "Skymaster" (Photo).* (Aeroplane, Vol. 64, No. 1,656, 19/2/43, p. 205.)
132	8128	U.S.A. ...	*Curtiss Caravan (Freight Craft) (Photo).* (Flight, Vol. 43, No. 1,777, 14/1/43, p. 45.)
			Gliders.
133	6920	U.S.A. ...	*Ford War Glider (15 Passengers) (Photo).* (Autom. Ind., Vol. 81, No. 10, 15/11/42, p. 54.)
134	6979	U.S.A. ...	*C.G. 4 (15-Passenger Glider) (Photograph).* (Am. Av., Vol. 6, No. 13, 1/12/42, p. 6.)
135	7797	U.S.A. ...	*C.G. 4a and Waco American Transport Gliders.* (Inter. Avia., No. 843, 11/11/42, p. 20.)
136	7831	U.S.A. ...	*Amphibian U.S. Navy Glider XLQ-1 (Photograph).* (Flight, Vol. 43, No. 1,783, 25/2/43, p. 202.)
137	7863	U.S.A. ...	*Cargo Gliders.* (Am. Av., Vol. 6, No. 15, 1/1/43, p. 18.)
138	7907	U.S.A. ...	*Douglas C.47 Towing Ford Glider (Photo).* (Flight, Vol. 43, No. 1,779, 28/1/43, p. 107.)
139	7924	G.B., U.S.A. ...	*War Gliders.* (N. D. Ryder, Flight, Vol. 43, No. 1,782, 18/2/43, pp. 171-174.)
140	7950	Germany ...	*Gotha Go. 246 Glider (Photo).* (Aeroplane, Vol. 64, No. 1,655, 12/2/43, p. 178.)
141	7967	G.B.	*Airspeed Horsa Glider (Photo).* (Aeroplane, Vol. 64, No. 1,656, 19/2/43, p. 202.)

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142	8122	Germany ...	*German Gliding Record.* (Flight, Vol. 43, No. 1,777, 14/1/43, p. 40.)
			A.R.P. and Barrage Balloons.
143	6931	France ...	*The Destruction of Towns by Blast Bombs.* (C. Rougeron, La Science et la Vie, Vol. 60, No. 291, Nov., 1941, pp. 259-268.)
144	6958	U.S.A. ...	*Liquid CO_2 Fire Extinguishers.* (Ind. and Eng. Chem. (News Ed.), Vol. 20, No. 24, 25/12/42, p. 1,688.)
145	6959	U.S.A. ...	*Mobile Sterilization Unit (Methyl Bromide).* (Ind. and Eng. Chem. (News Ed.), Vol. 20, No. 24, 25/12/42, p. 1,689.)
146	7747	U.S.A. ...	*Emergency Repair of Gas Mains.* (C. S. Goldsmith, A.S.M.E., Preprints No. 29, Annual Meeting, Nov. 30-Dec. 4, 1942.)
147	7763	U.S.A. ...	*A.R.P. Shop Lighting without Glare.* (Modern Plastics, Vol. 20, No. 1, Sept., 1942, p. 60.)
148	7773	U.S.A. ...	*U.S. Navy Blimps.* (Canadian Av., Vol. 15, No. 11, Nov., 1942, p. 114.)
149	7892	U.S.A. ...	*Barrage Balloons.* (W. H. Kendall, R. H. Redford, Coast Artillery J., Vol. 85, No. 5, Sept.-Oct., 1942, pp. 35-37.)
150	7894	G.B.	*British A.A. Rockets.* (Coast Artillery J., Vol. 85, No. 5, Sept.-Oct., 1942, p. 60.)
151	7987	G.B.	*Extinction of Metal Fires.* (Light Metals, Vol. 5, No. 56, Sept., 1942, p. 340.)
			Aero and Hydrodynamics.
			Flow (General, including Tunnels and Ejectors).
152	6895	U.S.A. ...	*Some Two-Dimensional Aspects of the Ejector Problem.* (J. A. Goff and C. H. Coogan, J. App. Mech., Vol. 9, No. 4, Dec., 1942, pp. 151-154.)
153	6940	G.B.	*Newton and Aerodynamics.* (Th. v. Kármán, Engineer, Vol. 175, No. 4,545, 19/2/43, pp. 149-150.)
154	7872	G.B.	*Wind Pressure on Structures.* (Mech. World, Vol. 113, No. 2,926, 29/1/43, pp. 127-129.)
155	7897	G.B.	*The Free Streaming of Gases in Sloping Galleries.* (E. H. M. Georgeson, Procs. Roy. Soc., Vol. 180, No. 983, 3/7/42, pp. 484-493.)
156	8172	Germany ...	*Symmetrical Potential Flow of a Compressible Gas about a Circular Cylinder in a Free Jet (Sub-Critical Region).* (E.Lamla, L.F.F., Vol. 19, No. 10-12, 11/1/43, pp. 358-362.)
157	8073	U.S.A. ...	*Study of the Aerodynamic Field of Flow by the Method of Filaments of Smoke.* (J. Valensi, Procs. of the 5th Internat. Congress for Applied Mechs., 1939, pp. 520-525.)
158	7804	G.B.	*Symmetrical Vortex Sheet in Sound Sensitive Plane Jets.* (P. Savie and J. W. Murphy, Phil. Mag., Vol. 34, No. 229, Feb., 1943, pp. 139-144.)
159	8074	U.S.A. ...	*Factors Influencing the Energy Ratio of Return Flow Wind Tunnels.* (F. L. Wattendorf, Procs. of the 5th Internat. Congress for Applied Mech., 1939, pp. 526-531.)

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			Turbulence.
160	8043	U.S.A. ...	*The Utilisation of Vortex Photographs for Quantitive Analysis of the Origin of Turbulence and Resistance.* (L. Schiller, Procs. of the 5th Internat. Congress for Applied Mech., 1939, pp. 315-320.)
161	8044	U.S.A. ...	*The Effect of Turbulence on Transition in the Boundary Layer of an Elliptic Cylinder.* (G. B. Schaubauer, Procs. of the 5th International Congress for Applied Mech., 1938, pp. 321-325.)
162	8047	U.S.A. ...	*Contribution to the Symposium on Turbulence.* (L. Prandtl, Procs. of the 5th Internat. Congress for Applied Mechs., 1939, pp. 340-346.)
163	8048	U.S.A. ...	*Some Remarks on the Statistical Theory of Turbulence.* (Th. von Kármán, Procs. of the 5th Internat. Congress for Applied Mechs., 1939, pp. 347-351.)
164	8049	U.S.A. ...	*Some Recent Researches on Turbulence.* (J. Kampe De Feriet, Procs. of the 5th International Congress for Applied Mech., 1939, pp. 352-355.)
165	8050	U.S.A. ...	*The Use of Statistical Theory in the Study of Turbulence.* (N. Wiener, Procs. of the 5th International Congress for Applied Mech., 1939, pp. 356-358.)
166	8051	U.S.A. ...	*Turbulence Investigations at the National Bureau of Standards.* (H. L. Dryden, Procs. of the 5th International Congress for Applied Mechs., 1939, pp. 362-368.)
167	8054	U.S.A. ...	*Note on Shearing Stresses Caused by Large Scale Lateral Mixing.* (C. G. Rossby, Procs. of the 5th Internat. Congress for App. Mechanics, 1939, pp. 379-381.)
168	8055	U.S.A. ...	*The Measurement of Correlation in Fluid Motions.* (E. G. Richardson, Procs. of the 5th Internat. Congress for App. Mechanics, 1939, pp. 382-385.)
169	8056	U.S.A. ...	*A Critical Discussion of Turbulent Flows in Channels and Circular Tubes.* (C. B. Millikan, Procs. of the 5th Internat. Congress for App. Mechanics, pp. 386-392.)
170	8058	U.S.A. ...	*Studies in Eddy Diffusion.* (W. L. Towle and others, Procs. of the 5th International Congress for App. Mechanics, 1939, pp. 396-402.)
171	8066	U.S.A. ...	*Note on the Statistical Theory of Turbulence.* (E. Reissner, Procs. of the 5th International Congress for Applied Mechs., 1939, pp. 359-361.)
			Boundary Layer.
172	8042	U.S.A. ...	*Transition as it Occurs Associated with the Following Laminar Separation.* (E. N. Jacobs and A. E. van Doenhoff, Procs. of the 5th Internat. Congress for Applied Mechanics, 1939, pp. 311-314.)
173	8045	U.S.A. ...	*The Stability of Plane Poiseuille Motion.* (J. L. Synge, Procs. of the 5th Internat. Congress for Applied Mech., 1939, pp. 326-332.)

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174	8046	U.S.A.	... *Hot Wires in Flight (Boundary Layer Investigations).* (A. V. Stephens and A. H. Hall, Procs. of the 5th Internat. Congress for Applied Mech., 1939, pp. 336-339.)
175	8057	U.S.A.	... *A Study in Boundary Layers.* (H. Peters, Procs. of the 5th Internat. Congress for App. Mechanics, 1939, pp. 393-395.)
176	8060	U.S.A.	... *Experiments on the Effects of Surface Roughness.* (E. F. Relf, Procs. of the 5th International Congress for Applied Mech., 1939, pp. 410-415.)
			Wing Theory and Flutter.
177	7730	U.S.A.	... *The Relationship Between Reynolds Number and Velocity Distribution.* (L. S. Rhodes, Annual Meeting of the A.S.M.E., Nov.-Dec., 1942.)
178	8059	U.S.A.	... *Wake Characteristics and Determination of Profile Drag by the Momentum Method.* (A. Silverstein, Procs. of the 5th Internat.. Congress for App. Mechanics, 1939, pp. 403-409.)
179	8068	U.S.A.	... *A Contribution to the Aerofoil Theory for Non-Uniform Motion.* (W. R. Sears, Procs. of the 5th Internat. Congress for Applied Mech., 1939, pp. 483-487.)
180	8069	U.S.A.	... *An Induced Angle Calculator.* (G. J. Klien, Procs. of the 5th Internat. Congress for Applied Mech., 1939, pp. 488-491.)
181	8100	U.S.A.	... *On Some Fourier Transforms in the Theory of Non-Steady Flows.* (I. E. Garrick, Procs. of the 5th Internat. Congress for Applied Mech., 1939, pp. 590-593.)
182	8101	U.S.A.	... *The Flutter Problem.* (T. Theodorsen, Procs. of the 5th Internat. Congress for Applied Mechanics, 1939, pp. 594-597.)
183	8173	Germany	... *Some Simple Formulæ Used in Wing Theory (Lift Distribution as Affected by Plan and Twist).* (H. B. Helmbold, L.F.F., Vol. 19, No. 10-12, 11/1/43, pp. 363-366.)
184	8174	Germany	... *The Downwash Along the Longitudinal Axis of a Wing with a Circulation Distribution According to Betz.* (G. Schulz, L.F.F., Vol. 19, No. 10-12, 11/1/43, pp. 367-373.)
			General Motion of Aircraft.
185	6989	Germany	... *Aerodynamics of the Fuselage.* (H. Multhopp, L.F.F., Vol. 18, No. 2-3, 29/3/41, pp. 52-56.) (R.T.P.3, Translation No. 1,220, and T.M. 1,036.)
186	8102	U.S.A.	... *The General Motion of the Aeroplane.* (S. Brodetsky, Procs. of the 5th Internat. Congress for Applied Mechs., 1939, pp. 599-605.)
187	8103	U.S.A.	... *Curvilinear Dynamics of Airships Based on Towed Model Tests.* (R. H. Smith, Procs. of the 5th Internat. Congress for Applied Mechs., 1939, pp. 606-613.)

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188	8171	Germany ...	*Influence of Atmospheric Density Gradient on the Longitudinal Motion of Aircraft (Errata).* (F. N. Schneubel, L.F.F., Vol. 19, No. 10-12, 11/1/43, p. 357.)
			Hydrodynamics (including Lubrication and Cavitation).
189	6902	U.S.A. ...	*Mechanism of Cavitation Erosion.* (T. C. Poulter, J. App. Mech., Vol. 9, No. 4, Dec., 1942, pp. 193-194.)
190	8061	U.S.A. ...	*Application of Statistical Theory of Turbulence to Hydraulic Problems.* (A. A. Kalinske and E. R. van Driest, Procs. of the 5th Internat. Congress for Applied Mech., 1939, 416-421.)
191	8063	U.S.A. ...	*The Flow of Fluids in Rotating Tanks.* (C. L. Peckeris, Procs. of the 5th Internat. Congress for Applied Mech., 1939, pp. 440-443.)
192	8064	U.S.A. ...	*The Vector Form of the Equations for the Motion of a Solid Through a Liquid.* (L. M. Milne-Thompson, Procs. of the 5th Internat. Congress for Applied Mechs., 1939, pp. 444-447.)
193	8065	U.S.A. ...	*On the Hydrodynamical Theory of the Viscosity of Suspensions.* (E. Guth, Procs. of the 5th International Congress for Applied Mech., 1939, pp. 448-455.)
194	8067	U.S.A. ...	*A Contribution to the Theory of Planing Surfaces.* (W. Ballay, Procs. of the 5th Internat. Congress for Applied Mechs., 1939, pp. 474-477.)
195	8071	U.S.A. ...	*Contribution to the Question of the Effect of the Basin Walls on Ship Model Tests.* (K. F. Tupper, Procs. of the 5th Internat. Congress for Applied Mechs., 1939, pp. 509-512.)
196	8072	U.S.A. ...	*Scale Effect in Tank Tests of Seaplane Models.* (L. P. Coombes, Procs. of the 5th Internat. Congress for Applied Mechs., 1939, pp. 513-519.)
197	8075	U.S.A. ...	*Curvilinear Flow of Liquids with Free Surfaces at Velocities Above that of Wave Propagation.* (R. T. Knapp and A. T. Ippen, Procs. of the 5th International Congress for Applied Mechs., 1939, p. 531.)
198	8076	U.S.A. ...	*Propagation of Finite Discontinuities in a Water Channel (Downstream Phenomena).* (Ph. Deynie, Procs. of the 5th Internat. Congress for Applied Mechs., 1939, pp. 537-544.)
199	8077	U.S.A. ...	*Research on the Theory of Running Water (Rivers).* (P. Masse, Procs. of the 5th International Congress for Applied Mechs., 1939, pp. 545-549.)
200	8079	U.S.A. ...	*Flow Through Granular Media.* (B. A. Bakhmeteff and N. V. Feodoaff, Procs. of the 5th International Congress for Applied Mechs., 1939, pp. 555-560.)
201	8090	U.S.A. ...	*The Thick Film Lubrication of Journal Bearings of Finite Length.* (M. Muskat and F. Morgan, Procs. of the 5th International Congress of Applied Mechs., 1939, pp. 642-648.)

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202	8097	U.S.A. ...	*Pressure Drop and Velocity Distribution for Incompressible Viscous Non-Isothermal Flow in the Steady State Through a Pipe.* (A. Lee and others, Procs. of the 5th Internat. Congress for Applied Mechs., 1939, pp. 571-577.)
203	8104	U.S.A. ...	*Cavitation Study by the Vibratory Method.* (H. Peters and B. Rightmire, Procs. of the 5th International Congress for Applied Mechs., 1939, pp. 614-616.)
204	8105	U.S.A. ...	*Fluid Dynamic Control of Fluid Flow (Control without Movable Mechanical Parts).* (K. D. McMahan, Procs. of the 5th Internat. Congress for Applied Mechanics, 1938, pp. 617-624.)
205	8106	G.B.	*On the Mechanism of the Fluid Oil Film in Bearings with Perfect Lubrication.* (G. B. Karelitz and others, Procs. of the 5th International Congress for Applied Mechs., 1939, pp. 625-630.)

Aircraft, Airscrews and Accessories.

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206	6981	U.S.A. ...	*Pressure Cabin for Testing Aircraft Equipment (Photograph).* (Am. Av., Vol. 6, No. 13, 1/12/42, p. 47.)
207	7835	G.B.	*High Altitude Flight—II.* (W. Nichols, Flight, Vol. 43, No. 1,783, 25/2/43, pp. 206-209.)
208	7870	U.S.A. ...	*Aircraft Wheel Balancing Machine.* (Am. Av., Vol. 6, No. 12, 15/11/42, p. 39.)
209	7927	G.B.	*High Altitude Flight (I).* (W. Nicholls, Flight, Vol. 43, No. 1,782, 18/2/43, pp. 180-183.)
210	8175	U.S.A. ...	*Flight Testing for Performance and Stability (with Discussion).* (E. T. Allen, J. Aeron. Sciences, Vol. 10, No. 1, Jan., 1943, pp. 1-30.)
211	8176	U.S.A. ...	*The 1914 Tests of the Langley "Aerodrome."* (C. G. Abbot, J. Aeron. Sciences, Vol. 10, No. 1, Jan., 1943, pp. 31-35.)
212	8177	U.S.A. ...	*Graphical Determination of Distance in Accelerated Aeroplane Motion.* (G. A. Mokrzycki, J. Aeron. Sciences, Vol. 10, No. 1, Jan., 1943, pp. 36-37.)

Stresses.

213	6984	G.B.	*Two-Spar Wing Stress Analysis.* (W. J. Goodey, Airc. Eng., Vol. 15, No. 167, Jan., 1943, pp. 2-7.)
214	6885	U.S.A. ...	*Stresses in Space-Curved Rings Reinforcing the Edges of Cut-Outs in Monocoque Fuselages.* (N. J. Hoff, J. Roy. Aeron. Soc., Vol. 47, No. 386, Feb., 1943, pp. 35-83.)
215	7937	G.B.	*Two-Spar Wing Stress Analysis (II).* (W. J. Goodrey, Airc. Eng., Vol. 15, No. 168, Feb., 1943, pp. 38-46.)
216	7672	U.S.A. ...	*The Determination of Fuselage Moments.* (C. E. Poppas, S.A.E. Preprint read at War Engineering Prod. Meeting, Jan. 11-15, 1943.)

ITEM NO.	R.T.P. REF.			TITLE AND JOURNAL.
217	8024	U.S.A.	...	*General Methods of Calculation of Two-Spar Wings Under Torsion.* (W. Billewicz and A. Jzedzielski, Procs. of 5th Internat. Congress of Applied Mechanics, 1939, pp. 151-158.)
				Cargo Plane Design.
218	7642	U.S.A.	...	*Structural Materials for the Cargo Aeroplane.* (H. D. Hoekstra, S.A.E. Meeting, Dec. 2nd-9th, 1942,, Preprint No. 31.)
219	7643	U.S.A.	...	*Deficiencies of Converted Passenger Aeroplanes for Cargo Transport and Operating Requirements.* (C. Froesch, S.A.E. Meeting, Preprint No. 32, Dec. 2nd-9th, 1942.)
220	7645	U.S.A.	...	*Aeroplane Design for Cargo Transportation.* (Carlos Wood, S.A.E. Meeting, Preprint No. 34, Dec. 2nd-9th, 1942.)
221	7888	U.S.A.	...	*Engineering Design for Air Cargo Systems, including Gliders (Symposium of Papers).* (A. W. Stronberg, S.A.E.J. Journal, Vol. 51, No. 1, Jan., 1943, pp. 15, 18 and 54-56.)
				Air Cargo Operation.
222	6980	U.S.A.	...	*Loading Devices for Cargo Planes (Photograph).* (Am. Av., Vol. 6, No. 13, 1/12/42, p. 22.)
223	7641	U.S.A.	...	*Air Pick-up and Gliders as Related to Future of Air Cargo.* (R. C. Dupont, S.A.E. Meeting, Preprint No. 30, Dec. 2nd-9th, 1942.)
224	7644	U.S.A.	...	*Securing Means for Air Cargo.* (Col. E. S. Evans, S.A.E.Meeting, Preprint No. 33, Dec. 2nd-9th, 1942.)
225	7646	U.S.A.	...	*Some Aspects of Air Cargo Operation in Latin America.* (J. Parker Van Zandt, S.A.E. Meeting, Preprint No. 35, Dec. 2nd-9th, 1942.)
226	7647	U.S.A.	...	*Packaging and Handling of Air Cargo.* (C. G. Peterson, S.A.E. Meeting, Preprint No. 36, Dec. 2nd-9th, 1942.)
227	7648	U.S.A.	...	*The Economics of Post-War Carriage of Air Cargo.* (J. V. Sheehan, S.A.E. Meeting, Preprint No. 37, Dec. 2nd-9th, 1942.)
				Civil Aviation.
228	6852	G.B.	...	*Revival of Civil Air Transport.* (Engineer, Vol. 175, No. 4,544, 12/2/43, pp. 132-133.)
229	7659	U.S.A.	...	*Cabin Supercharging in Scheduled Airline Operation.* R. L. Ellinger, S.A.E. Preprint, War Engineering Prod. Meeting, Jan. 11-15, 1943.)
230	7692	U.S.A.	...	*Pan-American Clippers.* (Commercial Aviation, Vol. 4, No. 8, Aug., 1942, pp. 92-96.)
231	7829	G.B.	...	*Air Transport Planning.* (A. J. Cobham, Flight, Vol. 43, No. 1,783, 25/2/43, pp. 196-197.)
232	7846	G.B.	...	*The Future of Civil Aviation.* (Aeroplane, Vol. 64, No. 1,653, 29/1/43, p. 137.)
233	7869	U.S.A.	...	*American Air Lines "Air Map."* (Am. Av., Vol. 6, No. 12, 15/11/42, p. 21.)
234	8135	G.B.	...	*Post-War Civil Aviation in G.B.* (Nature, Vol. 51, No. 3,824, 13/2/43, pp. 175-177.)

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			Airscrews.
235	6977	U.S.A. ...	*Vibration Test Unit for Curtiss Electric Propellers.* (Bladesman, Vol. 2, No. 1, Sept., 1942, pp. 6-10.)
236	6978	U.S.A. ...	*Propeller Cuffs.* (Bladesman, Vol. 2, No. 1, Sept., 1942, pp. 14-16.)
237	6990	U.S.A. ...	*The Hull and Its Screw Propeller.* (E. A. Stevens, J. Am. Soc. Nav. Engs., Vol. 54, No. 4, Nov., 1942, pp. 534-576.)
238	7836	G.B.	*Jettisonable Rotor to Provide Extra Lift.* (E. V. Hammond, Flight, Vol. 43, No. 1,783, 25/2/43, pp. 211-212.)
239	7866	U.S.A. ...	*General Motors New Contra Propeller (Photo).* (Am. Av., Vol. 6, No. 15, 1/1/43, p. 48.)
240	7943	U.S.A. ...	*Vought Sikorsky V.S.-300 Helicopter (Photo).* (Aeroplane, Vol. 64, No. 1,654, 5/2/43, p. 143.)
241	8070	U.S.A. ...	*Formulæ for Propeller Characteristics Calculation and the Method to Obtain the Best Pitch Distribution.* (T. Moriya, Procs. of the 5th Internat. Congress for Applied Mechs., 1939, pp. 504-508.)
			Engines and Accessories.
			Named Types.
242	6985	Germany ...	*Junkers Ju. 211 Aero Engine.* (S. Oldberg and T. M. Ball, Airc. Eng., Vol. 15, No. 167, Jan., 1943, pp. 8-18.)
243	7756	Japan ...	*Some Notes on Design Features of the Mitsubishi Kinsei Engine.* (W. G. Ovens, S.A.E., Preprint No. 4, National Aircraft Production Meeting, Oct. 1-3, 1942.)
244	7933	U.S.A. ...	*Wright Double-Row Cyclone (1,600 h.p. Radial).* (Flight, Vol. 43, No. 1,781, 11/2/43, pp. 156-157.)
245	8123	France ...	*French Gnome et Rhône 18-Cylinder Engine.* (Flight, Vol. 43, No. 1,777, 14/1/43, p. 40.)
246	8127	G.B.	*Gypsy Major I Aero Engine (Overhaul Periods).* (Flight, Vol. 43, No. 1,777, 14/1/43, pp. 44/45.)
			General Design and Performance.
247	6986	G.B.	*Standardization of Aero Engine Components.* (G. Carvelli, Airc. Eng., Vol. 15, No. 167, Jan., 1943, pp. 23-25 and 28.)
248	6987	Germany ...	*Aerodynamic Heat Power Engine Operating on a Closed Cycle.* (J. Ackeret and D. C. Keller, Z.V.D.I., Vol. 85, No. 22, 31/5/42, pp. 491-500.) (R.T.P. Translation No. 1,233 and T.M. 1,034.)
249	7662	U.S.A. ...	*New Materials for Aircraft Engines.* (M. Young and H. H. Hanink, S.A.E. Preprint, War Engineering Prod. Meeting, Jan. 11-15, 1943.)
250	7667	U.S.A. ...	*Influence of Engine Adjustment and Octane Number on Performance of Commercial Engines.* (D. P. Brenz and others, S.A.E. Preprint, War Engineering Prod. Meeting, Jan. 11-15, 1943.)
251	7673	U.S.A. ...	*Aviation Power Plants (Design and Construction).* (S. A. Moss, S.A.E. Preprint, War Engineering Prod. Meeting, Jan. 11-15, 1943.)

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252	7705	Germany ...	*Automatic Load-Speed Ignition Control for Spark Ignition Engine* (*Pat.* 688,841). (R. Bosch, Ltd., A.T.Z., Vol. 43, No. 8, 25/4/40, p. 209.)
253	7827	G.B.	*Definition of Volumetric Efficiency.* (P. H. Schweitzer, Engg., Vol. 155, No. 4,624, 26/2/43, pp. 178-179.)
254	8094	U.S.A. ...	*Mean Pressure Indicators for Internal Combustion Engines.* (S. El. Sawy, Procs. of the 5th Internat. Congress for Applied Mechs., 1939, pp. 673-676.)
255	8170	Germany ...	*On the Relation Between Shape, Spectrum and Manufacturing Accuracy of Engine Cams.* (K. Schlaefke, L.F.F., Vol. 19, No. 10-12, 11/1/43, pp. 353-357.)
			Stresses and Vibration.
256	6898	U.S.A. ...	*Short Gauge Extensometer for Crankshaft Stresses.* (C. W. Gadd, J. App. Mech., Vol. 9, No. 4, Dec., 1942, pp. 191-192.)
257	6905	U.S.A. ...	*Investigation of Self-Excited Torsional Oscillations and Vibration Damper for Induction Motor Drives.* (A. M. Wahl, E. G. Fischer, J. App. Mech., Vol. 9, No. 4, Dec., 1942, pp. 175-183.)
258	6988	Germany ...	*Control of Torsional Vibrations by Pendulum Masses.* (A. Stieglitz, Jahrbuch der deutschen, L.F.F., 1938, Vol. 2, pp. 164-178.) (R.T.P. Translation No. 1,012 and T.M. 1,035.)
259	6995	G.B.	*Axial Vibrations of Diesel Engine Crankshafts.* (R. Poole, J. Am. Soc. Nav. Engs., Vol. 54, No. 4, Nov., 1942, pp. 616-646.)
260	7663	U.S.A. ...	*Methods of Stress Determination in Engine Parts.* (C. Lipson, S.A.E. Preprint, War Engineering Prod. Meeting, Jan. 11-15, 1943.)
261	7726	U.S.A. ...	*Critical Speeds of a Rotor with Unequal Shaft Flexibilities, Mounted in Bearings of Unequal Flexibility—I.* (W. F. Foote and others, Annual Meeting of the A.S.M.E., Nov.-Dec., 1942.)
262	7885	Germany ...	*Endurance Tests on Light Alloy Connecting Rods (from the German).* (Light Metals, Vol. 5, No. 56, Sept., 1942, pp. 338-340.)
263	8093	U.S.A. ...	*Vibration Isolation of Aircraft Power Plants.* (E. S. Taylor and K. A. Browne, Procs. of the 5th International Congress for Applied Mechs., 1939, pp. 656-662.)
264	8178	U.S.A. ...	*Pendulum Type Vibration Absorbers.* (R. G. Manley, J. Aeron. Sciences, Vol. 10, No. 1, Jan., 1943, pp. 38-39.)
			Ring and Cylinder Wear.
265	7670	U.S.A. ...	*The Influence of Lubricating Oil Viscosity on Cylinder Wear.* (H. A. Everett, S.A.E. Preprint, read at War Engineering Prod. Meeting, Jan. 11-15, 1943.)
266	7883	U.S.A. ...	*Importance of Compression Rings in Controlling Oil Consumption.* (M. O. Teator, S.A.E.J. Trans., Vol. 51, No. 1, Jan., 1943, pp. 20-22.)

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267	7887	U.S.A. ...	*Piston Rings and Oil Control in a Cycle High Output Diesel Engine.* (F. G. Sholinaker and R. Albright, S.A.E.J. Trans., Vol. 51, No. 1, Jan., 1943, pp. 31-32.)
			Bearings and Static Friction.
268	6921	U.S.A. ...	*Bearing Corrosion in Cu.-Pb. Alloys.* (Autom. Ind., Vol. 87, No. 10, 15/11/42, p. 76.)
269	7631	U.S.A. ...	*Bearings and Bearing Corrosion.* (L. Raymond, J.S.A.E., Vol. 50, No. 12, Dec., 1942, pp. 533-537.)
270	7669	U.S.A. ...	*Corrosion of Bearing Alloys.* (L. M. Tichvinsky, S.A.E. Preprint, read at War Engineering Prod. Meeting, Jan. 11-15, 1943.)
271	7679	Germany ...	*Sliding Friction Wear of Iron and Steel Over the Temperature Range—190° to 700°C. (Digest).* (Stahl und Eisen, Vol. 62, No. 17, 23/4/42, p. 356.)
272	7739	U.S.A. ...	*Static Friction.* (W. Claypoole, A.S.M.E., preprint No. 9, Annual Meeting, Nov. 30-Dec. 4, 1942.)
273	7750	U.S.A. ...	*Bearings and Bearing Corrosion.* (L. Raymond, S.A.E., Preprint No. 9. National Fuels and Lubricants Meeting, Oct. 22-23, 1942.)
274	7818	G.B.	*Thrust Bearings for High Speeds.* (Machinery, Vol. 62, No. 1,579, 14/1/43, pp. 46-47.)
275	7889	U.S.A. ...	*Engine Bearings Replacement (Technique for Installation and Fitting).* (S.A.E.J. Journal, Vol. 51, No. 1, Jan., 1943, pp. 25-40.)
276	8009	G.B.	*Surface Finish of Journals.* (R. W. Dayton and others, Mech. World, Vol. 112, No. 2,920.)
277	8088	U.S.A. ...	*Theoretical Pressure Distribution in Journal Bearings.* (E. O. Waters, Procs. of the 5th Internat. Congress for Applied Mechs., 1939, pp. 631-637.)
278	8089	U.S.A. ...	*Thermal Equilibrium in Journal Bearings.* (M. D. Hersey, Procs. of the 5th Internat. Congress of Applied Mechanics, 1939, pp. 638-641.)
			Carburettors and Injection Pumps.
279	7664	U.S.A. ...	*Carburation for the Aircraft Engine.* (F. J. Wiegand, S.A.E. Preprint, War Engineering Prod. Meeting, Jan. 11-15, 1943.)
280	7706	Germany ...	*Fuel Injection Pump of the Gear Wheel Type (Pat. 688,970).* (O. Posch, A.T.Z., Vol. 43, No. 8, 25/4/40, p. 209.)
281	8001	G.B.	*S.U. Carburettor—Part I.* (F. C. Sheffield, Airc. Prod., Vol. 4, No. 47, Sept., 1942, pp. 537-543.)
			Air Filters.
282	6914	U.S.A. ...	*Aircraft Engine Air Filters (Digest).* (W. W. Cannon, Autom. Ind., Vol. 87, No. 10, 15/11/42, pp. 46-47.)
283	7754	U.S.A. ...	*Requirements for Carburettor Air Filters for Aircraft Engines.* (Wayne D. Cannon, S.A.E., Preprint No. 2, National Aircraft Production Meeting, Oct. 1-3, 1942.)

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				Pumps and Superchargers.
284	7660	U.S.A.	...	*The Elliott-Lysholm Supercharger.* (A. Lysholm and others, S.A.E. Preprint, the War Engineering Prod. Meeting, Jan. 11-15, 1943.)
285	7671	U.S.A.	...	*Hamilton-Whitfield Blower.* (J. E. Whitfield, S.A.E. Preprint, War Engineering Prod. Meeting, Jan. 11-15, 1943.)
286	7708	U.S.A.	...	*Centrifugal Pump Performance as a Function of Specific Speed.* (A. J. Stephanoff, A.S.M.E. Annual Meeting, Nov.-Dec., 1942.)
287	7794	Switzerland	...	*Brown Boveri Exhaust Supercharger on Merlin Engine.* (Inter. Avia., No. 843, 11/11/43, p. 16.)
				Boost Control.
288	7855	G.B.	...	*Boost Control.* (W. Maxwell, Flight, Vol. 43, No. 1,778, 21/1/43, pp. 65-66.)
289	8130	G.B.	...	*Boost Pressure Variation in Merlin Engines.* (N. D. Young and others, Flight, Vol. 43, No. 1,777, 14/1/43, p. 50.)
				Accessory Drives.
290	6922	G.B.	...	*Rotol Universal Gearbox.* (Autom. Ind., Vol. 87, No. 10, 15/11/42, p. 58.)
291	7712	U.S.A.	...	*Harmonic Analysis of a Hook's Joint Motion.* (F. A. Hiersch, Annual Meeting of A.S.M.E., Nov.-Dec., 1942.)
292	8010	G.B.	...	*Hydraulic Variable Speed Drive.* (Mech. World, Vol. 112, No. 2,920, 18/12/42, pp. 584-585.)
				Exhaust Phenomena.
293	7693	Canada	...	*Exhaust Gas Tester (Thermal Conductivity).* (Commercial Aviation, Vol. 4, No. 8, Aug., 1942, p. 128.)
294	7980	G.B.	...	*Exhaust Pipe Phenomena.* (G. F. Mucklow, Mech. World, Vol. CXII, No. 2,917, 27/11/42, pp. 506-511.)
				Turbines.
295	6991	U.S.A.	...	*End Losses of Turbine Blades (Discussion).* (J. Kreitner, J. Am. Soc. Nav. Engs., Vol. 54, No. 4, Nov., 1942, pp. 374-376.)
296	6993	U.S.A.	...	*Effect of Nozzle and Bucket Deposits on Turbine Capacity and Efficiency.* (B. O. Buckland, J. Am. Soc. Nav. Engs., Vol. 54, No. 4, Nov., 1942, pp. 595-605.)
297	7719	U.S.A.	...	*Application of Turbine Supervisory Instruments to Power Generating Equipment.* (J. L. Roberts, H. M. Dimond, A.S.M.E. Annual Meeting, Nov.-Dec., 1942.)
				Diesel Engines.
298	6855	G.B.	...	*Development of Doxford Marine Diesel.* (W. Ker Wilson, Engineering, Vol. 155, No. 4,022, 12/2/43, pp. 121-122.)

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299	6909	U.S.S.R. ...	*Two-Stroke Diesel with Exhaust Turbo-Supercharger (from the Russian).* (J. W. Swisstunoff, A. A. Kuritz, Autom. Ind., Vol. 87, No. 10, 15/11/42, pp. 28-31.)
300	6945	G.B.	*Development of the Dorford Marine Oil Engine.* (W. Ker Wilson, Engineering, Vol. 155, No. 4,023, 19/2/43, pp. 141-143.)
301	6994	Switzerland ...	*Silencers and Suppression of Noise in Oil Engines (Sulzer Review).* (J. Am. Soc. Nav. Engs., Vol. 54, No. 4, Nov., 1942, pp. 605-616.)
302	7630	U.S.A. ...	*Engineering Piston Rings for High-Speed Diesels.* (P. S. Lane and S. Nixon, J.S.A.E. (Trans.), Vol. 50, No. 12, Dec., 1942, pp. 529-532.)
303	7632	U.S.A. ...	*Diesel Piston Problems (Digest).* (J.S.A.E., Vol. 50, No. 12, Dec., 1942, p. 537.)
304	7633	U.S.A. ...	*Diesel Lubricating Problems (Digest).* (J.S.A.E., Vol. 50, No. 12, Dec., 1942, p. 527.)
305	7697	Germany ...	*Aero Engine Diesels (Review of Non-German Designs).* (H. Schneider, A.T.Z., Vol. 43, No. 8, 25/4/40, pp. 199-203.)
306	7698	Germany ...	*M.A.N.Process for High Speed Diesel Engine (Combustion Space Recessed in Piston).* (S. Meurer, A.T.Z., Vol. 43, No. 8, 25/4/40, pp. 185-190.)
307	7700	Germany ...	*Combustion in Pre-Combustion Chamber (Diesel).* (K. Schnakig, A.T.Z., Vol. 43, No. 8, 25/4/40, pp. 263-264.)
308	7701	Germany ...	*Design Modifications for a 25 per cent. Increase in Diesel Engine Speed.* (L. Geisler, A.T.Z., Vol. 43, No. 8, 25/4/40, pp. 191-196.)
309	7748	U.S.A. ...	*New Methods for the Evaluation and Recording of Piston Skirt Deposits.* (H. R. Luck and others, S.A.E., Preprint No. 7, National Fuels and Lubricants Meeting, Oct. 22-23, 1942.)
310	7823	G.B.	*Development of the Doxford Marine Oil Engine.* (W. Ker Wilson, Engg., Vol. 155, No. 4,024, 26/2/43, pp. 161-163.)
			Fuels and Lubricants.
			Fuel and Oil Industry.
311	6932	France ...	*Scientific Search for Natural Oil Deposits.* (H. Doyen, La Science et la Vie, Vol. 60, No. 291, Nov., 1941, pp. 269-276.)
312	6976	G.B.	*Italy's Oil Industry.* (Petroleum Times, Vol. 47, No. 1,186, 9/1/43, p. 11.)
313	7636	U.S.A. ...	*Meeting Wartime Fuel Problems.* (Ollison Craig, Annual Meeting A.S.M.E., Fuels Division, Preprint No. 100, Sept. 30-Oct. 1, 1942.)
314	7649	U.S.A. ...	*Re-Refining of Aircraft Engine Oils.* (G. K. Brower, S.A.E. Meeting, Preprint No. 38, Dec. 2nd-9th, 1942.)
315	7881	U.S.A. ...	*A Refiner's Viewpoint on Motor Fuel Quality.* (W. M. Holaday and J. Happel, S.A.E.J., Vol. 51, No. 1, Jan., 1943, pp. 1-11.)

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316	7995	G.B.	*Economics of Oil Refining in Great Britain.* (G. Tugendhat, Autom. Eng., Vol. 33, No. 433, Feb., 1943, pp. 59-60.)
			Testing.
317	7628	U.S.A. ...	*Effect of Diesel Fuel on Exhaust Smoke and Odour.* (R. S. Wetmiller and L. E. Endsley, J.S.A.E., Vol. 50, No. 12, Dec., 1942, pp. 509-520.)
318	7675	U.S.A. ...	*Effect of Altitude on the Knocking Tendency of Engines.* (D. B. Brooks, S.A.E. Preprint, War Engineering Prod. Meeting, Jan. 11-15, 1943.)
319	7751	U.S.A. ...	*Correlation of Laboratory Oil Bench Tests with Full-Scale Engine Tests.* (C. W. Georgi, S.A.E. Preprint No. 10, National Fuels and Lubricants Meeting, Oct. 22-23, 1942.)
320	7807	U.S.A. ...	*High Duty Lubricants and Additives.* (Ind. and Eng. Chem., Vol. 21, No. 1, 10/1/43, pp. 24-25.)
321	7882	U.S.A. ...	*Gasoline Engine Exhaust Odours.* (J. J. Mikita and others, S.A.E.J.,, Trans., Vol. 51, No. 1, Jan., 1943, pp. 12-19.)
322	7962	G.B.	*The Spectra of Chilled Hydrocarbon Flames.* (A. G. Gaydon, Procs. Roy. Soc., Vol. 179, No. 979, 27/2/42, pp. 439-449.)
323	8086	U.S.A. ...	*Acoustical Analysis of the Pressure Waves Accompanying Detonation in the Internal Combustion Engine.* (C. S. Draper and P. M. Morse, Procs. of the 5th Internat. Congress for Applied Mechs., 1939, pp. 727-732.)
324	8146	G.B.	*Continuous Chemical Gas Analysis with Soap Films as Rate of Flow Indicators.* (R. H. Powell, Metal Industry, Vol. 62, No. 10, 5/3/43, pp. 147-148.)
325	8168	Germany ...	*Measurement of Ignition Lag of Liquid Fuels for Spark Ignition Engines.* (E. Lonn, L.F.F., Vol. 19, No. 10-12, 11/1/43, pp. 344-346.)
			Gaseous Fuels.
326	7696	Germany ...	*Operation of Transport Diesel Engines with Gaseous Fuels.* (L. Koler, A.T.Z., Vol. 43, No. 8, 25/4/40, pp. 183-184.)
327	7704	Germany ...	*Ammonia-Hydrogen Mixtures for Transport Engines* (*Pat.* 686,809). A. Casale, A.T.Z., Vol. 43, No. 8, 25/4/40, p. 210.)
328	7725	U.S.A. ...	*Constructing the Lirette Mobile Natural Gas Transmission Line.* (W. B. Poor, Annual Meeting of A.S.M.E., Nov.-Dec., 1942.)
329	7979	G.B.	*Diesel Ignition on Producer Gas (Glasgow Scheme).* (Mechanical World, Vol. CXII, No. 2,917, 27/11/42, p. 505.)
330	7997	G.B.	*Portable Gas Producers.* (E. R. Slattery, Autom. Eng., Vol. 33, No. 433, Feb., 1943, pp. 69-72.)
			Replacement Fuels.
331	6924	France ...	*French Home Produced Fuels and Lubricants.* (H. Doyen, La Science et la Vie, Vol. 60, No. 292, Dec., 1941, pp. 314-320.)

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332	6934	France ...	*Small Charcoal Burners with Recovery of Volatile Products.* (V. Rubor, La Science et la Vie, Vol. 60, No. 291, Nov., 1941, pp. 298-330.)
333	7999	Australia ...	*Charcoal from Wheat in Australia.* (Autom. Eng., Vol. 33, No. 433, Feb., 1943, p. 83.)
			Powdered Fuels.
334	6853	G.B.	*Burning Sawdust.* (Engineer, Vol. 175, No. 4,544, 12/2/43, p. 139.)
335	7702	Germany ...	*Ash Free Coal Extracts for Operation of Coal Dust Engine.* (W. Wilke, A.T.Z., Vol. 43, No. 8, 25/4/40, pp. 196-198.)
336	7703	Germany ...	*Experiences with Coal Dust Engines in Germany.* (A.T.Z., Vol. 43, No. 8, 25/4/40, p. 198.)
337	7736	U.S.A. ...	*Pulverized Coal in the Metallurgical Industries.* (C. F. Herington, Annual Meeting of A.S.M.E., Nov.-Dec., 1942.)
			Miscellaneous.
338	6967	G.B.	*Abstracts Issued by the Fuel Research Intelligence Section.* (23 and 30 Jan., 1943.)
339	7982	G.B.	*Treated Cardboard Containers for Petrol.* (Mechanical World, Vol. CXII, No. 2,917, 27/11/42, p. 521.)
			Theory of Elasticity.
			General.
340	6859	G.B.	*Extreme Properties of Matter (Possible Limits of Strength of Density, etc.).* (C. G. Darwin, Engineering, Vol. 155, No. 4,022, 12/2/43, pp. 136-137.)
341	6946	G.B.	*Extreme Properties of Matter.* (C. G. Darwin, Engineering, Vol. 155, No. 4,023, 19/2/43, pp. 144-145.)
342	7652	U.S.A. ...	*Influence of Lattice Distortion on Diffusion in Metals (with Discussion).* (V. G. Mooredian and J. T. Norton, Trans., Am. Inst. of M. and M. Eng. (Met. Div.), Vol. 117, 1935, pp. 89-101.)
343	7710	U.S.A. ...	*The Centre of Shear.* (W. R. Osgood, Annual Meeting of A.S.M.E., Nov.-Dec., 1942.)
344	7738	U.S.A. ...	*New Five-Bar and Six-Bar Linkages in Three Dimensions.* (M. Goldberg, Annual Meeting of A.S.M.E., Nov.-Dec., 1942.)
345	7878	G.B.	*Molecular Structure and Rubber-like Elasticity.* (C. W. Bunn, Procs. Roy. Soc., Vol. 180, No. 980, 18/3/42, pp. 40-99.)
346	7890	G.B.	*Some Practically Important Stress Systems in Solids of Revolution.* (R. V. Southwell, Procs. Roy. Soc., Vol. 180, No. 983, 3/7/42, pp. 367-396.)
347	7898	G.B.	*Crystal Theory of Metals, Calculation of the Elastic Constants.* (K. Fuchs and H. W. Peng, Procs. Roy. Soc., Vol. 180, No. 983, 3/7/42, pp. 451-476.)

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348	7963	G.B.	...	*Stress-Strain Curve for the Atomic Lattice of Mild Steel and the Physical Significance of the Yield Point of a Metal.* (S. L. Smith and W. A. Wood, Procs. Roy. Soc., Vol. 179, No. 979, 27/2/42, pp. 450-460.)
349	8021	U.S.A.	...	*On the Theory of Dislocations and an Application to the Plane Stress Problem of a System of Forces Acting at a Hole.* (J. N. Goodier, Procs. of 5th Internat. Congress of App. Mechanics, 1939, pp. 129-133.)
350	8029	G.B.	...	*Stress Concentration in Steel Shafts with Semi-Circular Notches.* (H. F. Moore and R. L. Jordan, Procs. of 5th Internat. Congress of App. Mechanics, 1939, pp. 188-192.)
351	8036	U.S.A.	...	*Certain Phases of the Combined Stress Problem.* (J. M. Lessels and C. W. Macgreggor, Procs., 5th Internat. Congress for Applied Mech., 1939, pp. 201-207.)
352	8039	U.S.A.	...	*On Isotropic Materials with Continuous Transition from Elastic to Plastic State.* (W. Prager, Procs. of the International Congress for Applied Mechanics, 1939, pp. 234-237.)
353	8092	U.S.A.	...	*The Deformation of Elastically Mounted Rails Caused by Loads Moving at Constant Horizontal Velocity (Rails Extending to Infinity in Both Directions).* (K. Ludwig, Procs. of the 5th International Congress for Applied Mechs., 1939, pp. 650-655.)
354	8138	G.B.	...	*Classification of Rheological Properties.* (R. Bartlett, Nature, Vol. 151, No. 3,824, 13/2/42, pp. 198-199.)
				Plates and Panels.
355	6900	U.S.A.	...	*Buckling of Circular Plates Beyond Critical Thrust.* (K. O. Friedrichs and J. J. Stoker, J. App. Mech., Vol. 9, No. 4, Dec., 1942, p. 192.)
356	6903	U.S.A.	...	*Buckling of Rectangular Plates with Built-in Edges.* (S. Levy, J. App. Mech., Vol. 9, No. 4, Dec., 1942. pp. 171-174.)
357	7711	U.S.A.	...	*Stresses and Displacements in a Rotating Conical Shell.* (J. L. Meriam, Annual Meeting of A.S.M.E., Nov.-Dec., 1942.)
358	7744	U.S.A.	...	*The Influence of the Shape and Rigidity of an Elastic Inclusion on the Transverse Flexure of Thin Plates.* (Martin Goland, A.S.M.E., Preprint No. 17, Annual Meeting, Nov. 30-Dec. 4, 1942.)
359	7801	G.B.	...	*Boundary Couples in Thin Plates.* (A. C. Stevenson, Phil. Mag., Vol. 34, No. 229, Feb., 1943, pp. 105-114.)
360	7875	G.B.	...	*The Buckling of a Long Curved Panel Under Axial Compression.* (D. M. A. Leggett, R. and M., No. 1,899, 18/7/42.)

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361	8022	U.S.A. ...	*Application of Orthotropic Plate Theory to Ship Bottom Structure.* (H. H. Schade, Procs. of 5th Internat. Congress of App. Mechanics, 1939, pp. 140-144.)
362	8035	U.S.A. ...	*Experimental Study of Sheet-Stringer Panels Under End Compression.* (L. Ramberg and others, Procs. of the 5th Internat. Congress for Applied Mechs., 1939, p. 199.)
			Structures.
363	6950	G.B.	*Recent Developments in Structural Engineering.* (R. H. Evans, Engineering, Vol. 155, No. 4,023, 19/2/43, pp. 155-156.)
364	7826	G.B.	*Recent Developments in Structural Engineering.* (R. H. Evans, Engineering, Vol. 155, No. 4,024, 26/2/43, p. 176.)
365	8023	U.S.A. ...	*Principles of Moment Distribution Applied to Stability of Structural Members (with Discussion).* (E. E. Lundquist, Procs. of 5th Internat. Congress of App. Mechanics, 1939, pp. 145-149.)
366	8025	U.S.A. ...	*The Application of Reciprocal Force Diagrams to Space Frame Works.* (P. D. Crout, Procs. of 5th Internat. Congress of App. Mechanics, 1939, pp. 159-163.)
367	8026	U.S.A. ...	*Stresses and Deformations in Two-Hinged Vierendeel Truss Arches.* (L. C. Maugh, Procs. of 5th Internat. Congress of App. Mechanics, 1939, pp. 164-170.)
368	8027	U.S.A. ...	*On Methods of Calculating Stresses in the Hulls of Rigid Airships.* (K. Arnstein, E. L. Shaw, Procs. of 5th Internat. Congress for App. Mechanics, 1939, pp. 171-177.)
369	8032	U.S.A. ...	*Strength of a Riveted Steel Frame having Straight Flanges.* (A. H. Stang and others, Procs. of the 5th Internat. Congress for Applied Mechs., 1939, p. 200.)
			Springs.
370	6861	G.B.	*Relaxation Resistance of Ni-Alloy Springs (Load Loss at Constant Height).* (B. B. Betty and others, Metal Industry, Vol. 62, No. 7, 12/2/43, pp. 98-100.)
371	7741	U.S.A. ...	*Volute-Spring Formulas.* (C. J. Holland, A.S.M.E., Preprint No. 12, Annual Meeting, Nov. 30-Dec. 4, 1942.)
372	7742	U.S.A. ...	*Notes on Secondary Stresses in Volute Springs.* (H. O. Fuchs, A.S.M.E., Preprint No. 13, Annual Meeting, Nov. 30-Dec. 4, 1942.)
			Columns.
373	6896	U.S.A. ...	*Long Longitudinal Columns.* (F. G. Switzer, J. App. Mech., Vol. 9, No. 4, Dec., 1942, pp. 189-190.)
374	7802	G.B.	*The Torsion of Fluted Columns.* (A. C. Stevenson, Phil. Mag., Vol. 34, No. 229, Feb., 1943, pp. 115-120.)

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			Stress Distribution.
375	6897	U.S.A. ...	*Experimental Determination of the Isostatic Lines.* (A. J. Durell, J. App. Mech., Vol. 9, No. 4, Dec., 1942, pp. 155-160.)
376	6899	U.S.A. ...	*The Photo-Elastic Analysis of Transverse Bending of Plates in the Standard Transmission Polariscope.* D. C. Drucker, J. App. Mech., Vol. 9, No. 4, Dec., 1942, pp. 161-164.)
377	6906	U.S.A. ...	*Brittle Coatings for Quantitative Strain Measurements.* (A. V. de Forest and others, J. App. Mech., Vol. 9, No. 4, Dec., 1942, pp. 184-188.)
378	7608	G.B.	*Beaumount Indicator for Proof Stress Determinations.* (Airc. Prod., Vol. 5, No. 52, Feb., 1943, pp. 101-102.)
379	7729	U.S.A. ...	*A Photo-Elastic Study of Bolt and Nut Fastenings.* (M. Hetényi, Annual Meeting of A.S.M.E., Nov.-Dec., 1942.)
380	7732	U.S.A. ...	*The Holding Power and Hydraulic Tightness of Expanded Tube Joints: Analysis of the Stress and Deformation.* (J. N. Goodier, Annual Meeting, A.S.M.E., Nov.-Dec., 1942.)
381	7745	U.S.A. ...	*Measurement of Dynamic Strain.* (C. O. Dohrenwend and W. R. Mehaffy, Preprint No. 18, Annual Meeting, Nov. 30-Dec. 4, 1942.)
382	7761	U.S.A. ...	*Calculation of Modulus of Impact (Plastics).* (A. W. Koon, Modern Plastics, Vol. 20, No. 1, Sept., 1942, p. 88.)
383	7936	G.B.	*Strain Gauge Technique in Design.* (C. R. Strang, Airc. Eng., Vol. 15, No. 168, Feb., 1943, pp. 32-37.)
384	7978	G.B.	*The Filming of Slip Lines (Whitewashed Steel Strip).* (Mechanical World, Vol. CXII, No. 2,917, 27/11/42, p. 505.)
385	8028	U.S.S.R. ...	*The Extension Accompanying Contraction of a Test Bar Undergoing Rupture by Tension (including the Work of Rupture).* (W. Broniewski, Procs. of 5th Internat. Congress of App. Mechanics, 1939, pp. 178-182.)
386	8030	U.S.A. ...	*The "Pack" Test for Determining the Compressive Stress-Strain Graphs for Thin-Wall Material.* (C. S. Aitchison and L. B. Tuckerman, Procs. of the International Congress for Applied Mechanics, 1939, pp. 159-163.)
387	8033	U.S.A. ...	*Photostatic Studies of Three-Dimensional Stress Problems (Bakelite Specimens).* (M. Hetenyi, Procs. of the 5th Internat. Congress for Applied Mechs., 1939, p. 208.)
388	8034	U.S.A. ...	*Thermal Stresses in Cylinders by the Photo-Elastic Methods.* (E. E. Weibel, Procs. of the 5th Internat. Congress for Applied Mechs., 1939, pp. 213-220.)
389	8037	U.S.A. ...	*On the Optical Determination of Isopachic Stress Patterns.* (M. M. Frocht, Procs. of the 5th Internat. Congress for Applied Mechs., 1939, pp. 221-227.)

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390	8095	U.S.A. ...	*Measurement of Impact Strains.* (A. V. Deforest, Procs. of the 5th Internat. Congress for Applied Mechanics, 1939, pp. 673-676.)
			Plastic Flow and Creep.
391	6992	U.S.A. ...	*Mechanics of Creep for Structural Analysis.* (J. Am. Soc. Nav. Engs., Vol. 54, No. 4, Nov., 1942, pp. 578-594.)
392	7731	U.S.A. ...	*Effect of Deoxidation Practice on Creep Strength of Carbon-Molybdenum Steel at* 850° *and* 1,000°*F.* (R. F. Miller, Annual Meeting of A.S.M.E., Nov.-Dec., 1942.)
393	7740	U.S.A. ...	*A Principle of Maximum Plastic Resistance.* (M. A. Sadowsky, A.S.M.E., Preprint No. 11, Annual Meeting, Nov. 30-Dec. 4, 1942.)
394	8038	U.S.A. ...	*Failure of a Material Showing Creep (a Dynamic Theory of Strength).* (M. Riener and A. Freudenthal, Procs. of the 5th International Congress for Applied Mechs., 1939, pp. 228-233.)
395	8040	U.S.A. ...	*Plastic Flow and Creep in Polycrystalline Materials.* (C. R. Soderberg, Procs. of the 5th Internat. Congress for Applied Mechs., 1939, pp. 238-244.)
396	8041	U.S.A. ...	*Relaxation of Steels at Elevated Temperatures (a New Automatic Testing Machine).* (A. Nadai and J. Boyd, Procs. of the 5th Internat. Congress for Applied Mechs., 1939, pp. 245-248.)
			Vibration.
397	6904	U.S.A. ...	*Self-Excited Oscillations in Systems with Retarded Actions.* (N. Minorsky, J. App. Mech., Vol. 9, No. 4, Dec., 1942, pp. 195-196.)
398	7603	G.B.	*Avery-Shenk Dynamic Balancing Machine.* (Airc. Prod., Vol. 5, No. 52, Feb., 1943, p. 102.)
399	7629	U.S.A. ...	*Dynamically Stable Spring Suspension for Railway Cars and Motor Coaches.* (P. K. Beemer and F. C. Lindvall, J.S.A.E. (Trans.), Vol. 50, No. 12, Dec., 1942, pp. 521-527.)
400	7727	U.S.A. ...	*The Free Lateral Vibrations of a Cantilever Beam with a Terminal Dashpot.* (E. J. McBride, Annual Meeting of A.S.M.E., Nov.-Dec., 1942.)
401	7743	U.S.A. ...	*Effectiveness of Shear-Stressed Rubber Compounds in Isolating Machinery Vibration.* (B. C. Madden, A.S.M.E., Preprints No. 14, Annual Meeting, Nov. 30-Dec. 4, 1942.)
402	7939	G.B.	*Theory of Shock Absorbic Design.* (F. E. Burger, Airc. Eng., Vol. 15, No. 168, Feb., 1943, pp. 51-54.)
403	8080	U.S.A. ...	*On the Suppression of Vibrations on Board Large Ocean Liners.* (H. Beghin, Procs. of the 5th Internat. Congress for Applied Mechs., 1939, pp. 677-680.)
404	8081	U.S.A. ...	*Steady Forced Oscillations of Permanent Non-Linear Systems.* (M. Rauscher, Procs. of the 5th Internat. Congress for Applied Mechs., 1939, pp. 681-684.)

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405	8082	U.S.A. ...	*On Non-Harmonic Oscillations.* (Y. Watanabe, Procs. of the 5th Internat. Congress for Applied Mechs., 1939, pp. 685-689.)
406	8084	U.S.A. ...	*A Note on the Natural Vibration of Semi-Cantilever Beam.* (M. Yamamoto, Procs. of the 5th Internat. Congress for Applied Mech., 1939, pp. 708-711.)
407	8085	U.S.A. ...	*"Spiral" Vibrations of Rotating Machinery.* (R. P. Kroon and W. A. Williams, Procs. of the 5th Internat. Congress for Applied Mechs., 1939, pp. 712-718.)
			Fatigue.
408	7707	U.S.A. ...	*The Effect of Rest Periods on the Time and Fatigue Strengths of Metallic Materials.* (Bollenrath, F., and Cornelius, H., N.A.C.A. Paper, Oct., 1942, Trans. No. 104 from V.D.I. Zeitschrift, Vol. 84, No. 18, 4/5/40.)
409	8169	Germany ...	*Bending Fatigue Strength of Connections in Built-up Crankshafts.* (F. Gauss, L.F.F., Vol. 19, No. 10-12, 11/1/43, pp. 347-352.)
			Materials.
			Al. and Mg. Alloys.
410	6862	G.B.	*Sand Control in Magnesium Foundries.* (E. M. Cramer, Metal Industry, Vol. 62, No. 7, 12/2/43, pp. 103-104.)
411	6863	U.S.A. ...	*Mg. and Al. Production in the U.S.A.* (Metal Industry, Vol. 62, No. 7, 12/2/43, p. 104.)
412	6875	G.B.	*Information Bulletin No. 2, Specification and Properties of Wrought Al. Alloys.* (Wrought Light Alloys Dev. Ass., Nov., 1942.)
413	6955	U.S.A. ...	*Developments in the Al. Industry in the U.S.A.* (F. C. Trary, Ind. and Eng. Chem. (News Ed.), Vol. 20, No. 24, 25/12/42, pp. 1,646-1,648.)
414	6960	G.B.	*Metallography of Mg. Alloys.* (J. B. Hess and P. F. George, Metal Industry, Vol. 62, No. 8, 19/2/43, pp. 114-116.)
415	7654	U.S.A. ...	*Quenching Stresses and Precipitation Reactions in Al.-Mg. Alloys.* (R. M. Bosick and others, Trans. Am. Inst. of M. and M. Engs. (Met. Div.), Vol. 117, 1935, pp. 102-118.)
416	7656	U.S.A. ...	*Effect of Composition on Mechanical Properties and Corrosive Resistance of Some Al. Alloy Die Castings.* (E. H. Dix and J. J. Bowman, Trans. Am. Inst. of M. and M. Engs. (Met. Div.), Vol. 117, 1935, pp. 357-370.)
417	7810	G.B.	*Metallography of Mg. Alloys.* (J. B. Hess and P. F. George, Metal Industry, Vol. 62, No. 9, 26/2/43, pp. 136-138.)
418	7981	G.B.	*Al. Casting Alloys (Effect of Minor Alloying Elements).* (Mechanical World, Vol. CXII, No. 2,917, 27/11/42, p. 521.)
419	7986	U.S.A. ...	*Sea Water Magnesium Production in the U.S.A.* (Light Metals, Vol. 5, No. 56, Sept., 1942, pp. 373-374.)

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420	7988	Germany ...	*Reflectivity of Aluminium.* (Light Metals, Vol. 5, No. 56, Sept., 1942, pp. 377-379.)
421	7991	Germany ...	*Properties and Application of Al. Containing Zinc Base Alloys (Die Castings and Wrought Alloys) (from the German).* (Light Metals, Vol. 5, No. 56, Sept., 1942, pp. 354-361.)
422	8149	G.B.	*Protection of Mg. and its Alloys.* (Metal Industry, Vol. 62, No. 10, 5/3/43, p. 156.)
423	8167	Germany ...	*Investigations on Al.-Zn.-Mg. Wrought Alloys.* (A. Mühlenbruch, H. J. Seemann, L.F.F., Vol. 19, No. 10-12, 11/1/43, pp. 337-343.)
			Non-Ferrous.
424	6866	G.B.	*Palladium as a Substitute for Platinum.* (Metal Industry, Vol. 62, No. 7, 12/2/43, p. 109.)
425	7055	U.S.A. ...	*Properties of Platinum Metals.* (E. M. Wise and J. T. Eash, Trans. Am. Inst. of M. and M. Eng. (Met. Div.), Vol. 117, 1935, pp. 313-328.)
426	7713	U.S.A. ...	*Creep and Relaxation of Oxygen-Free Copper.* (E. A. Davis, Annual Meeting of A.S.M.E., Nov.-Dec., 1942.)
427	7873	G.B.	*Beryllium Copper and its Applications.* (D. W. Crossley, Vol. 20, No. 1, Jan., 1943, pp. 7-9.)
428	7983	G.B.	*Al.-Bearing Heavy Alloys.* (Light Metals, Vol. 5, No. 56, Sept., 1942, pp. 335-336.)
429	7992	G.B.	*Beryllium Alloys (Patent Review).* (Light Metals, Vol. 5, No. 56, Sept., 1942, pp. 361-363.)
			Plastics.
430	6840	G.B.	*Oil as an Additional Basic Material for the British Plastic Industry (Digest).* (G. Tugendhat, Plastics, Vol. 7, No. 69, Feb., 1943, pp. 51-52.)
431	6841	Germany ...	*Welding of Thermoplastics (from the German).* (G. Henning, Plastics, Vol. 7, No. 69, Feb., 1943, pp. 53-59 and 92.)
432	6842	G.B.	*Poly-iso-butylene (Vistanex and Isolene).* (Plastics, Vol. 7, No. 69, Feb., 1943, pp. 60-62.)
433	6844	G.B.	*Plastics in Assembled Building Structure (IV).* (G. Teger, Plastics, Vol. 7, No. 69, Feb., 1943, pp. 64-70.)
434	6845	G.B.	*Polyvinylidene Chloride Film Materials.* (E. E. Halls, Plastics, Vol. 7, No. 69, Feb., 1943, pp. 74-80.)
435	6847	G.B.	*Resinoids and Other Plastics as Film Formers (XVI, Laminar Systems).* (B. J. Brajnikoff, Plastics, Vol. 7, No. 69, Feb., 1943, pp. 83-92.)
436	6878	Switzerland ...	*Melamine-Formaldehyde Condensation Products.* (A. Gams and others, British Plastics, Vol. 14, No. 165, Feb., 1943, pp. 508-520.)
437	6879	G.B.	*Behaviour of Plastics Under Vibration.* (British Plastics, Vol. 14, No. 165, Feb., 1943, p. 520.)
438	6883	U.S.A. ...	*Slenderness Ratio of Plastics.* (A. Friedman and E. Lofgren, British Plastics, Vol. 14, No. 165, Feb., 1943, pp. 545-547.)

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439	6884	U.S.A. ...	*Mar Resistance of Plastics (Loss of Gloss with Abrasives).* (L. Boor, British Plastics, Vol. 14, No. 165, Feb., 1943, pp. 548-560.)
440	6918	U.S.A. ...	*New Application of Panelyte in the Aircraft Industry (Laminated Plastic) (Digest).* (C. R. Mahaney, Autom. Ind., Vol. 87, No. 10, 15/11/42, pp. 48, 76.)
441	6942	G.B.	*Resilitex (Resilient Woven Textile to Replace Sponge Rubber).* (Engineer, Vol. 175, No. 4,545, 19/2/43, pp. 159-160.)
442	6954	U.S.A. ...	*National Chemical Exposition, Chicago (Plastic Developments).* (Ind. and Eng. Chem. (News Ed.), Vol. 20, No. 24, 25/12/42, pp. 1,627-1,633.)
443	6963	G.B.	*Plastics Abstracts No. 41, Jan., 1943, Issued by the Controller of Chemical Research.*
444	6999	G.B.	*Bonding Plastic and Metal (Plastels).* (Aire. Prod., Vol. 5, No. 52, Feb., 1943, pp. 55-56.)
445	7728	U.S.A. ...	*Physical Properties of Laminated Plastics.* (R. W. Barber, Annual Meeting of the A.S.M.E., Nov.-Dec., 1942.)
446	7758	U.S.A. ...	*New Applications of "Panelyte" in the Aircraft Industry.* (C. R. Mahaney, S.A.E., Preprint No. 6, National Aircraft Production Meeting, Oct. 1-3, 1942.)
447	7760	U.S.A. ...	*Fedralite Piping (Laminated Paper).* (H. W. Richter, Modern Plastics, Vol. 20, No. 1, Sept., 1942, pp. 48-49.)
448	7764	U.S.A. ...	*Lignin-Enriched Filler.* (J. G. Meiler, Modern Plastics, Vol. 20, No. 1, Sept., 1942, pp. 64-66, 128-130.)
449	7767	U.S.A. ...	*Mar-Resistance of Plastics.* (L. Boor, Modern Plastics, Vol. 20, No. 1, Sept., 1942, pp. 79-85, 126-128.)
450	7768	U.S.A. ...	*Plastics Statistics for 1941.* (Modern Plastics, Vol. 20, No. 1, Sept., 1942, pp. 86-87.)
451	7781	G.B.	*Resilitex (Textile Resilient).* (Aire. Prod., Vol. 5, No. 53, March, 1943, p. 110.)
452	7789	G.B.	*Recording Plastometer for Organic Plastics.* (Nature, Vol. 151, No. 3,822, 30/1/42, p. 142.)
453	7960	G.B.	*Plastic Tubing for Electric Conduits.* (Electrical Times, Vol. 102, No. 2,664, 12/11/42, p. 700.)
			Ply Woods and Wood Plastic.
454	6872	G.B.	*Interesting Glueing Device for Wooden Aircraft Parts.* (Prod. and. Eng. Bull., Vol. 2, No. 1, Oct., 1942, pp. 15-17.)
455	6880	G.B.	*Stress-Strain in Compression of Resin-Bonded Plywoods.* (G. Rostler, British Plastics, Vol. 14, No. 165, Feb., 1943, p. 534.)
456	7640	U.S.A. ...	*An Analysis of the Factors Responsible for Raised Grain on the Wood of Oak following Sanding and Staining.* G. G. Marra, Annual Meeting A.S.M.E., Fuels Division, Preprint No. 102, Sept. 30-Oct. 1, 1942.)

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457	7759	U.S.A.	...	*Low Pressure Laminating.* (J. D. Nelson and G. F. d'Alelio, Modern Plastics, Vol. 20, No. 1, Sept., 1942, pp. 45-47, 122-124.)
458	7762	U.S.A.	...	*Resin-Bonded Plywood for Gliders.* (Modern Plastics, Vol. 20, No. 1, Sept., 1942, pp. 52-55.)
459	7765	U.S.A.	...	*Scarfed Joints in Plywood.* (T. D. Perry, Modern Plastics, Vol. 20, No. 1, Sept., 1942, pp. 74-75, 116-120.)
460	7886	U.S.A.	...	*Wood Plastic in Mass Production of Aircraft.* (S.A.E.J., Trans., Vol. 51, No. 1, Jan., 1943, p. 30.)
461	8002	G.B.	...	*Moulded Plywood Aircraft (Vidal Process).* (Airc. Prod., Vol. 4, No. 47, Sept., 1942, pp. 544-546.)
462	8012	G.B.	...	*Cementing Stainless Steel Sheet to Plywood.* (Mech. World, Vol. 112, No. 2,920, 18/12/42, p. 595.)
463	8031	G.B.	...	*Bibliography of Published Information on Wood, Improved Wood and Cellulose Plastics. (Supplement to Earlier Bibliography.)* (R.T.P.3, Bibliography No. 70, Ministry of Aircraft Production, Feb., 1943.)
				Rubber (Natural and Synthetic).
464	6846	U.S.A.	...	*Synthetic Rubber Production in the U.S.A. (Output Figures).* (Plastics, Vol. 7, No. 69, Feb., 1943, p. 80.)
465	7871	G.B.	...	*Synthetic Rubber (Flow Sheet of Manufacture).* (Mech. World, Vol. 113, No. 2,926, 29/1/43, pp. 127-129.)
466	7879	G.B.	...	*The Structure of Polychloroprene.* (C. J. Birkitt Clews, Procs. Roy. Soc., Vol. 180, No. 980, 18/3/42, pp. 100-107.)
467	7880	U.S.A.	...	*Synthetic Rubber Production.* (S.A.E.J., Vol. 51, No. 1, Jan., 1943, p. 57.)
468	7940	G.B.	...	*Modern Synthetic Rubbers (Book Review).* (H. Barron, Airc. Eng., Vol. 15, No. 168, Feb., 1943, pp. 48-49.)
469	7998	G.B., U.S.A.	...	*Rubber Supplies (Natural and Synthetic).* (Autom. Eng., Vol. 33, No. 433, Feb., 1943, pp. 79-80.)
				Solders.
470	7809	G.B.	...	*High Lead Solders.* (Metal Industry, Vol. 62, No. 9, 26/2/43, p. 134.)
471	7812	G.B.	...	*A New Bismuth Alloy for Proof Casting (Cerrosafe).* (J. H. Christie, Metal Industry, Vol. 62, No. 9, 26/2/43, p. 140.)
472	8147	G.B.	...	*Bismuth Solders.* (Metal Industry, Vol. 62, No. 10, 5/3/43, pp. 150-151.)
				Glass and Sapphires.
473	6913	U.S.A.	...	*New Glass Products for War Equipment ("Golden" Glass for Filtering Out Ultra-Violet in the Substratosphere).* (Autom. Ind., Vol. 87, No. 10, 15/11/42, p. 42.)
474	6957	U.S.A.	...	*Synthetic Sapphires (Bearings, Cutting Tools, Injection Nozzles).* (Ind. and Eng. Chem. (News Ed.), Vol. 20, No. 24, 25/12/42, p. 1,666.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
			General (Fund. Properties).
475	6849	G.B. ...	... *Introduction to Soil Mechanics—II.* (W. L. Lowe-Brown, Engineer, Vol. 174, No. 4,544, 12/2/43, pp. 124-126.)
476	6939	G.B. ...	... *Introduction to Soil Mechanics—III.* (W. L. Lowe-Brown, Engineer, Vol. 175, No. 4,545, 19/2/43, pp. 144-146.)
477	6974	G.B. ...	... *References to and Abstracts from Current Literature.* (Bull. of British Non-Ferrous Materials R.A., Dec., 1942, pp. 374-397.)
478	7651	U.S.A.	... *Gases in Metals (Conditions of Association, Defects Due to Diffusion of H_2, Effect of Temp. on Solubility, Blowholes, Method of Removal of Gas, etc.).* (C. A. Edwards, Trans. Am. Inst. of M. and M. Eng. (Met. Div.), Vol. 117, 1935, pp. 13-38.)
479	7800	U.S.A.	... *"Strategic Materials" of the United Nations (Metals).* (Inter. Avia., No. 843, 11/11/43, pp. 21-22.)
480	7811	G.B. ...	... *Uses of Silver in Wartime.* (R. H. Leach and J. H. Christie, Metal Industry, Vol. 62, No. 9, 26/2/43, pp. 139-140.)
481	7838	Germany	... *The Mathematical and Physical Importance of the Partial Molar Coefficients and the Deduction of the Duhera-Margules Law of Partial Pressures.* (K. Fredenhagen, Z. fur Elektrochenic and Ang. Physick Chemie, Vol. 48, No. 3, March, 1942, pp. 136-145.)
482	7862	G.B. ...	... *The Mechanical Properties of Metal Foils.* (B. Chalmers and P. W. Seddon, J. Inst. Metals, Vol. 68, No. 9, Sept., 1942, pp. 283-309.)
483	7959	G.B. ...	... *Removing Dissolved Salts in Water (Deminrolit Process).* (Electrical Times, Vol. 102, No. 2,664, 12/11/42, pp. 696-698.)
484	7961	G.B. ...	... *Interaction Between Adsorbed Substances of Simple Constitution and Insoluble Monolayers.* (K. G. A. Pankhurst, Procs. Roy. Soc., Vol. 179, No. 979, 27/2/42, pp. 393-399.)
485	7965	G.B. ...	... *Condensed Monomolecular Films.* (A. E. Alexander, Procs. Roy. Soc., Vol. 179, No. 979, 27/2/42, pp. 470-499.)
486	7966	G.B. ...	... *Supersonic Dispersion in Gases.* (A. E. Alexander and J. D. Lambert, Vol. 179, No. 979, 27/2/42, pp. 499-511.)
487	8078	U.S.A.	... *Experiments on the Mechanics of Sediment Suspension.* (H. Rouse, Procs. of the 5th International Congress for Applied Mechs., 1939, pp. 550-554.)
488	8087	U.S.A.	... *Three Hundred Years of Mechanics of Materials.* (S. C. Hollister, Procs. of the 5th Internat. Congress for Applied Mechs., 1939, pp. 735-739.)
			Steel.
489	6886	G.B. ...	... *Deleterious Influence of Tin on Alloy Steels.* (G. R. Bolsover and S. Barraclough, Engineering, Vol. 155, No. 4,022, 12/2/43, p. 128.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
490	7637	U.S.A. ...	*The Elimination of Carry-Over Under Steel-Mill Operating Conditions.* (H. M. Rivers and W. P. Hill, Annual Meeting, A.S.M.E., Fuels Div., Preprint No. 101, Sept. 30-Oct. 1, 1942.)
491	7676	Germany ...	*The Present State of Development of Heat Resisting Cast Steel.* (F. Schulte, Stahl und Eisen, Vol. 62, No. 19, 7/5/42, pp. 389-397.)
492	7677	Germany ...	*The Influence of N_2 on Austenitic and Austenitic-Ferritic Cr.-Ni. Steels.* (R. Scherer and others, Stahl und Eisen, Vol. 62, No. 17, 23/4/42, pp. 347-352.)
493	7680	Germany ...	*The Intercrystalline Stress Corrosion of Steel (with Discussion).* (H. Buckholtz and R. Pusch, Stahl und Eisen, Vol. 62, No. 2, 8/1/42, pp. 21-30.)
494	7681	Germany ...	*The Influence of Alloying Constituents on the Tensile and Fatigue Strength of Heat Treated Steels.* (Stahl und Eisen, Vol. 62, No. 2, 8/1/42, pp. 32-35.)
495	7682	Germany ...	*The Most Suitable Design of Electric Arc Furnaces for Manufacture of Steel.* (H. Muller, Stahl und Eisen, Vol. 61, No. 29, 17/7/41, pp. 685-694.)
496	7783	G.B.	*Forging, Annealing and Normalising Temperatures for Steel.* (Airc. Prod., Vol. 5, No. 53, March, 1943, pp. 121-126.)
497	7684	Germany ...	*Rapid Determination of Cr. and P. in Pig Iron and Steel (Six Minutes).* (Stahl und Eisen, Vol. 62, No. 3, 15/1/42, p. 53.)
498	7824	U.S.A. ...	*High Tension Steels for Light Weight Construction.* (Engg., Vol. 155, No. 4,024, 26/2/43, pp. 167-168.)
			Hardness and Temper Brittleness.
499	6857	G.B.	*Chromizing Process for Steel (Atmosphere of Gaseous Chromium Chloride).* (Engineering, Vol. 155, No. 4,022, 12/2/43, p. 130.)
500	7683	Germany ...	*Hardenability of Some Low and High Carbon and Alloy Steels Free from Molybdenum.* (A. Krisch, Stahl und Eisen, Vol. 62, No. 3, 15/1/42, pp. 48-53.)
501	7685	Germany ...	*Direct Reading Brinell Hardness Testing Machine.* (Stahl und Eisen, Vol. 62, No. 3, 15/1/42, pp. 53-54.)
502	7686	Germany ...	*Influence of P. and Several Alloying Constituents on the Temper Brittleness of Structural Steels.* (E. Maurer and others, Stahl und Eisen, Vol. 62, No. 5, 29/1/42, pp. 81-89.)
503	7715	U.S.A. ...	*A Practical Way to Prevent Embrittlement Cracking.* (A. A. Berk, W. C. Schroeder, Annual Meeting of A.S.M.E., Nov.-Dec., 1942.)
504	8166	Germany ...	*Strength, Depth of Hardening and Toughness of Heat-Treated Replacement Steels (Mn.-Cr.).* (A. Krisch, L.F.F., Vol. 19, No. 10-12, 11/1/43, pp. 331-336.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
			Welding.
505	6888	G.B.	*Heliarc Welding Process.* (Machinist, Vol. 86, No. 39, 9/1/43, p. 1,043.)
506	6916	U.S.A. ...	*Spot Welding in Aircraft (Digest).* (*Giving Table of Minimum Weld Spacing.*) (G. S. Mikhalapov, Autom. Ind., Vol. 87, No. 10, 15/11/42, p. 48.)
507	6943	G.B.	*Atomic-Hydrogen Welding Equipment.* (Engineer, Vol. 175, No. 4,545, 19/2/43, p. 160.)
508	6997	U.S.A. ...	*Welding Fumes from Arc Welding and Their Danger to Health.* (G. C. Harold, J. Am. Soc. Nav. Engs., Vol. 54, No. 4, Nov., 1942, pp. 650-657.)
509	7653	U.S.A. ...	*Welded Pressure Vessels.* (R. K. Hopkins, Trans. Am. Inst. of M. and M. Engs. (Met. Div.), Vol. 117, 1935, pp. 387-398.)
510	7699	G.B.	83 *Abstracts Issued by the Welding Research Council.* (Vol. 4, No. 4, Nov., 1942.)
511	7753	U.S.A. ...	*The Place and Use of Spot Welding in Design and Production of Aircraft.* (G. S. Mikhalapov, S.A.E., Preprint No. 1, National Aircraft Production Meeting, Oct. 1-3, 1942.)
512	7868	G.B.	*Welded Constructed Machine Bases.* (Machinery, Vol. 61, No. 1,578, 7/1/43, p. 5.)
513	7990	G.B.	*Al. Wire Welding Apparatus.* (Light Metals, Vol. 5, No. 56, Sept., 1942, pp. 352-353.)
			Stretch and Pressing.
514	7678	Germany ...	*The Production of Seamless Tubing by the Combined Action of Stretching and Guide Discs.* (Stahl und Eisen, Vol. 62, No. 17, 23/4/42, pp. 353-354.)
515	7819	G.B.	*Sheet Stretching Machine (Sheridan).* (Machinery, Vol. 62, No. 1,599, 14/1/43, p. 51.)
516	7784	G.B.	*Stretch Pressing.* (Airc. Prod., Vol. 5, No. 53, March, 1943, pp. 125-126.)
517	8004	G.B.	*Hydraulic Stretching Press.* (Airc. Prod., Vol. 4, No. 47, Sept., 1942, pp. 56-562.)
			Degreasing.
518	6947	G.B.	"*Fraser Heller*" *Metal Degreasing System.* (Engineering, Vol. 155, No. 4,023, 19/2/43, pp. 146-147.)
519	7885	U.S.A. ...	*Chemical Protective Treatment and Cleaning Methods in Aircraft Production* (*Chrometising, Phosphatising, Anodising, Degreasing for Spot Welding, etc.*). (R. Sanders, S.A.E.J., Trans., Vol. 51, No. 1, Jan., 1943, pp. 223-30.)
			Electroplating.
520	6843	G.B.	*Electroplating on Non-Conducting Materials.* (Plastics, Vol. 7, No. 69, Feb., 1943, p. 63.)
521	6923	U.S.A. ...	*Electroplated Zinc in Steel.* (Autom. Ind., Vol. 87, No. 10, 15/11/42, p. 70.)
522	6944	G.B.	*Electroplating on Non-Conducting Materials.* (Engineer, Vol. 175, No. 4,545, 19/2/42, p. 160.)

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523	7650	G.B.	*Electrodeposition of Zn. and Cd. on Al. and Al. Alloys.* (B. K. Braund and H. Sutton, Electrodepositions Tec. Soc., Vol. 11, pp. 57-73.)
524	7779	G.B.	*Electroplating Non-Conducting Materials.* (Airc. Prod., Vol. 5, No. 53, March, 1943, p. 108.)
525	7780	G.B.	*Chrome-Plated Parts (Tolerances for Production Components Plated to Engineering Limits).* (H. G. Conway, Airc. Prod., Vol. 5, No. 53, March, 1943, p. 109.)
526	7984	G.B.	*Electrodeposition on Al. and its Light Alloys.* (Light Metals, Vol. 5, No. 56, Sept., 1942, pp. 368-370.)
			Rolling and Drawing.
527	6865	G.B.	*Deep Drawing of Zn. and Zn. Alloys.* (F. Erdmann and H. Hanemann, Metal Industry, Vol. 62, No. 7, 12/2/43, pp. 103-108.)
528	6962	G.B.	*Deep Drawing of Zn. and Zn. Alloys.* (F. Erdmann-Jesnitzer and H. Hanemann, Metal Industry, Vol. 62, No. 8, 19/2/42, pp. 119-120.)
529	7714	U.S.A. ...	*The Distribution of Strains in the Rolling Process.* (C. W. MacGregor, L. F. Coffin, Annual Meeting of A.S.M.E., Nov.-Dec., 1942.)
530	8113	Germany ...	*Deep Drawing of Parabolic Containers with a Rubber Die.* (R. Hartmann, Der Betrieb, Vol. 21, No. 9, Sept., 1942, p. 388.)
			Machining, Drilling and Grinding.
531	6887	G.B.	*The Machining of Cast Armour Plate.* (F. W. Lucht, Machinist, Vol. 86, No. 39, 9/1/43, p. 250 F.)
532	6912	U.S.A. ...	*Machining Aluminium.* (R. L. Templin, Autom. Ind., Vol. 87, No. 10, 15/11/42, pp. 38-42.)
533	7718	U.S.A. ...	*Drilling Deep Holes in Magnesium Alloys.* (W. W. Gilbert, A. M. Lennie, A.S.M.E., Annual Meeting, Nov.-Dec., 1942.)
534	7766	U.S.A. ...	*Grinding and Machining Cast Resins.* (C. E. Holmes, Modern Plastics, Vol. 20, No. 1, Sept., 1942, pp. 76-77, 130-132.)
535	7817	G.B.	*Abrasive Mounted Wheels and Points.* (Machinery, Vol. 62, No. 1,579, 14/1/43, pp. 42-44.)
536	7993	G.B.	*Heat Treatment and Machinability of 582 Gears.* (Mech. World, Vol. 112, No. 2,920, 18/12/42, pp. 529-580.)
537	7996	G.B.	*Precision Gear Cutting and Grinding (Hobourn Aero Components).* (Autom. Eng., Vol. 33, No. 433, Feb., 1943, pp. 61-68.)
538	8116	Germany ...	*The Utilisation of Combined Steel and Ceramic Wheels for the Setting of Grindstones and Their Effect on Obtainable Grinding Fits.* (W. Davihl, Der Betrieb, Vol. 21, No. 9, Sept., 1942, pp. 381-383.)
			Powder Metallurgy.
539	6874	G.B.	*Powdered Metals in Machine Design (Gears and Bearings).* (Machinery, Vol. 61, No. 1,578, 7/1/43, pp. 1-4.)

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540	7867	G.B.	*Powdered Metals in Machine Design—II.* (Machinery, Vol. 61, No. 1,578, 7/1/43, pp. 1-4.)
			X-Ray Examination.
541	6868	U.S.A. ...	*X-Ray Diffraction Camera for 300°C.* (A. Bretteville, Rev. of Sci. Insts., Vol. 13, No. 11, Nov., 1942, pp. 481-483.)
542	6891	G.B.	*Investigation of Ceramic Materials by Optical and X-Ray Analysis.* (E. Rosenthal, Electronic Engineering, Vol. 15, No. 179, Jan., 1943, pp. 320-323.)
543	7605	G.B.	*Industrial Radiography.* (Airc. Prod., Vol. 5, No. 52, Feb., 1943, p. 87.)
544	7688	Germany ...	*Iron Ores—Structural Examination by Means of X-Rays.* (Stahl und Eisen, Vol. 62, No. 5, 29/1/42, p. 94.)
545	7786	G.B.	*Industrial Radiography.* (Airc. Prod., Vol. 5, No. 53, March, 1943, p. 134.)
546	7788	G.B.	*X-Ray Evidence of the Nature of Cold Work in Metals.* (A. R. Stokes and others, Nature, Vol. 151, No. 3,822, 30/1/43, p. 137.)
547	7808	G.B.	*Radiography as an Aid to Foundry Technique.* (W. Gladwell, Metal Industry, Vol. 62, No. 9, 26/2/43, pp. 130-134.)
548	7989	G.B.	*X-Rays and the Light Metal Industry (Examination).* (E. J. Tunnicliffe, Light Metals, Vol. 5, No. 56, Sept., 1942, pp. 341-352.)
549	8148	G.B.	*Location of Flaws by Stereo Radiography.* (T. Rigbey, Vol. 62, No. 10, 5/3/43, pp. 152-153.)
550	8151	Germany ...	*New Apparatus for the Non-Destructive Testing of Materials.* (Schweizerische Technische Zeitschrift, 1940, p. 562.)
			Magnetic Methods.
551	7822	G.B.	*Electromagnetic Crack Detector in Welded Tubular Structure.* (Engineer, Vol. 175, No. 4,546, 26/2/43, pp. 178-179.)
552	7935	Germany ...	*A New Double Joke Electromagnet for the Testing of Magnet Steels.* (F. Stablien and R. Steinitz, Tech. Milteel Krupp, Vol. 3, 1935, pp. 129-135.)
553	7994	Germany ...	*Magnetic Method for Testing the State of Heat Treatment of Fabricated Products.* (H. Lange, Kaiser Wilhelm Inst. fur Eisenf, Vol. 21, No. 6, 1939, pp. 105-113.)
554	7695	Canada ...	*Magnaflux Inspection.* (Commercial Aviation, Vol. 4, No. 8, Aug., 1942, p. 136.)
			Instruments.
			Physiological.
555	6871	U.S.A. ...	*A Continuous Electronic Pulse Rate Indicator and Recorder.* (M. M. Schwarzschild and M. C. Schelesnyak, Rev. of Sci. Insts., Vol. 13, No. 11, Nov., 1942, pp. 496-501.)
556	6894	G.B.	*Miniature Electrocardiography.* (Electronic Engineering, Vol. 15, No. 179, Jan., 1943, pp. 346-347.)

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			Navigation.
557	7691	Canada ...	*A New Instrument for Celestial Navigation.* (N. W. Storer, Commercial Av., Vol. 4, No. 5, Aug., 1942, pp. 86-90.)
558	7770	Canada ...	*Astral Navigation.* (J. W. Nelson, Canadian Av., Vol. 15, No. 11, Nov., 1942, pp. 48-55.)
559	7798	U.S.A. ...	*Ice Indicator.* (Inter. Avia., No. 843, 11/11/42, p. 21.)
560	7837	G.B.	*Navigation Above Clouds (Astrodome) (Photo).* (Flight, Vol. 43, No. 1,783, 25/2/43, p. 215.)
561	8133	G.B.	*Terrain Altimeter (Television).* (Flight, Vol. 43, No. 1,777, 14/1/43, p. 34.)
			Flow Meter.
562	6877	G.B.	*Float Type Flow Meter.* (J. Sci. Inst., Vol. 19, No. 12, Dec., 1942, pp. 186-187.)
563	7709	U.S.A. ...	*The Effect of Installation on the Coefficients of Venturi Meters.* (W. S. Pardoe, A.S.M.E., Annual Meeting, Nov.-Dec., 1942.)
564	7721	U.S.A. ...	*Results of Tests on Volumeters for Liquid Hydrocarbons.* (J. S. Pigott, Annual Meeting of A.S.M.E., Nov.-Dec., 1942.)
			Electronic.
565	6864	U.S.A. ...	*A Scanning Electron Microscope.* (Metal Industry, Vol. 62, No. 7, 12/2/43, p. 104.)
566	6869	U.S.A. ...	*Electronic Liquid Level Indicator (Change of Capacitance of Electric Condenser).* (S. C. Coronite, Rev. of Sci. Insts., Vol. 13, No. 11, Nov., 1942, pp. 484-488.)
567	6892	G.B.	*Colour Television.* (Electronic Engineering, Vol. 15, No. 179, Jan., 1943, p. 327.)
568	6893	G.B.	*Electron Optics—Part II.* (D. Gabor, Electronic Engineering, Vol. 15, No. 179, Jan., 1943, pp. 328-337.)
569	7638	U.S.A. ...	*Experience in the Use of Electrostatic Fly-Ash Precipitators.* (J. G. McChesney, Annual Meeting, A.S.M.E., Fuels Division, Preprint No. 102, Sept. 30-Oct. 1, 1942.)
			Instruments—Miscellaneous.
570	6998	U.S.A. ...	*Graphical Measurement of Space and Plane Angles.* (H. E. Steven, J. Am. Soc. Nav. Engs., Vol. 54, No. 4, Nov., 1942, pp. 660-672.)
571	7694	Canada ...	*Fabric Permeameter (Cambridge Scient. Inst. Co.).* (Commercial Aviation, Vol. 4, No. 8, Aug., 1942, p. 134.)
			Production.
			Organisation and Control.
572	6858	G.B.	*Wartime Standardisation.* (C. le Maistre, Engineering, Vol. 155, No. 4,022, 12/2/43, pp. 137-136.)
573	6956	U.S.A. ...	*Economics in Alloy Metals Effected in Germany by Standardisation.* (Ind. and Eng. Chem. (News Ed.), Vol. 20, No. 24, 25/12/42, p. 1,654.)

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574	7665	U.S.A. ...	*A Body Plant Goes to War (Switch Over from Car to Aircraft Production).* (L. B. Rivard, S.A.E. Preprint, War Engineering Prod. Meeting, Jan. 11-15, 1943.)
575	7666	U.S.A. ...	*Tool Shop Organisation and Methods.* (W. F. Pioch, S.A.E. Preprint, War Engineering Prod. Meeting, Jan. 11-15, 1943.)
576	7674	U.S.A. ...	*The Conversion of Plants of the Automotive Industry to War Production.* (J. Geschelin, S.A.E. Preprint read at War Engineering Prod. Meeting, Jan. 11-15, 1943.)
577	7722	U.S.A. ...	*The Pride of America (American Patent System).* (A. A. Potter, Annual Meeting of A.S.M.E., Nov.-Dec., 1942.)
578	7733	U.S.A. ...	*Ten Years' Progress in Management.* (Annual Meeting of A.S.M.E., Nov.-Dec., 1942.)
579	7735	U.S.A. ...	*Progress in Cost Control* (1932-1942). (W. P. Fiske, Annual Meeting, A.S.M.E., Nov.-Dec., 1942.)
580	7815	G.B.	*Practical Quality Control.* (Machinery, Vol. 62, No. 1,579, 14/1/43, p. 33.)
581	7816	G.B.	*Quality Control v. Direct Inspection.* (H. Biggs, Machinery, Vol. 62, No. 1,579, 14/1/43, p. 41.)
582	7941	G.B.	*Quality Control in Production Engineering.* (H. Rissick, Airc. Eng., Vol. 15, No. 168, Feb., 1943, pp. 55-58.)
583	8115	Germany ...	*Review of Literature on Work Planning.* (R. Bach, Der Betrieb, Vol. 21, No. 9, Sept., 1942, pp. 393-394.)
			Research and Training.
584	6949	G.B.	*Post War Industrial Research.* (Engineering, Vol. 155, No. 4,023, 19/2/43, pp. 151-152.)
585	6982	G.B.	*Synchrophone Method of Audio-Visual Instruction.* (Engineering, Vol. 155, No. 4,023, 19/2/43, pp. 157-158.)
586	6961	G.B.	*Industrial Value of Research.* (W. C. Devereux Metal Industry, Vol. 62, No. 8, 19/2/43, pp. 117-118.)
587	7661	U.S.A. . .	*Co-operative Research Comes of Age.* (C. B. Veal, S.A.E. Preprint, War Engineering Prod. Meeting, Jan. 11-15, 1943.)
588	7752	U.S.A. ..	*Standard Practice Instruction.* (J. Willard Lord, S.A.E., Preprints No. 11, National Fuels and Lubricants Meeting, Oct. 22-23, 1942.)
589	7774	G.B.	*Planning of Science (Summary of Papers Presented at Conference of the Association of Scientific Workers).* (Airc. Prod., Vol. 5, No. 53, March, 1943, p. 136.)
590	7806	U.S.A. ...	*Industrial Research at the Armour Research Foundation, 1941-1942.* (Ind. and Eng. Chem., Vol. 21, No. 1, 10/1/42, pp. 17-26.)
591	7787	G.B.	*I.S.M. Synchrophone (Combined Visual and Aural Training).* (Airc. Prod., Vol. 5, No. 53, March, 1943, p. 134.)

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592	7836	G.B. ...	... *Advances of Chemical Kinetics in the Soviet Union.* (N. Seminov, Nature, Vol. 151, No. 3,824, 13/2/43, pp. 185-187.)
593	7915	G.B. ...	... *Sandor Synchrophone Training System (Sound and Friction Combination for Explaining Mechanical Complexities).* (Flight, Vol. 43, No. 1,780, 4/2/43, p. 130.)
594	8140	G.B. ...	... *Organisation of Scientific Research and Development (Conference of Association of Sci. Workers).* (Nature, Vol. 151, No. 3,825, 20/2/43, pp. 203-207.)
595	8145	G.B. ...	... *Education and Training of Engineers—I.* (Engineer, Vol. 175, No. 4,547, 5/3/42, pp. 190-191.)
596	8182	Germany	... *Educational Methods in Aircraft Engineering.* (H. Wenke, Luftwissen, Vol. 10, No. 1, Jan., 1943, pp. 15-22.)
			Production Methods (General).
597	6881	Germany	... *Tegowiro (Hot Wire) Method of Glueing.* (E. Egner, British Plastics, Vol. 14, No. 165, Feb., 1943, pp. 538-540.)
598	6907	U.S.A.	... *Some Aircraft Problems (Rapid Quenching for Dural, Water-Soluble Oil for Forming Operations, etc.).* (T. E. Piper, Autom. Ind., Vol. 87, No. 10, 15/11/42, pp. 19, 68, 70.)
599	7600	G.B. ...	... *Drop Hammer Technique (Compound Curvature in Sheet Metal).* (Airc. Prod., Vol. 5, No. 52, Feb., 1943, pp. 57-60.)
600	7604	G.B. ...	... *Infra Red Radiation for Paint Drying and Shrink Fitting Operation.* (Airc. Prod., Vol. 5, No. 52, Feb., 1942, pp. 83-87.)
601	7607	G.B. ...	... *Mobile Assembly Methods (Esarian Trolley).* (Airc. Prod., Vol. 5, No. 52, Feb., 1943, pp. 97-100.)
602	7658	U.S.A.	... *Methods and Metallurgy of Shell (Artillery) Manufacture.* (C. L. Eksorgian, S.A.E., War Engineering Prod. Meeting, Jan. 11-15, 1943.)
603	7668	U.S.A.	... *Substitute Materials—Have We Gone the Limit?* (J. G. Wood, S.A.E., War Engineering Prod. Meeting, Jan. 11-15, 1943.)
604	7757	U.S.A.	... *Impact Extrusion and Cold Pressing of Airplane Parts.* (Phil. Koenig, S.A.E., Preprints No. 5, National Aircraft Production Meeting, Oct. 1-3, 1942.)
605	7785	G.B. ...	... *Sheet Metal Working for Aircraft.* (W. S. Neville, Airc. Prod., Vol. 5, No. 53, March, 1943, pp. 129-133.)
606	7814	G.B. ...	... *Zinc Base Alloy Forming and Blanking Dies for Aeroplane Parts (Kirksite).* (Machinery, Vol. 62, No. 1,579, 14/1/43, pp. 35-40.)
607	8111	Germany	... *Metal Stamping—Basic Time Calculation for Individual Operations.* (H. Gritzbauch and K. Gollnick, Der Betrieb, Vol. 21, No. 9, Sept., 1942, pp. 385-388.)

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608	8183	Germany	...	*Light Alloy Extruded Profiles.* (W. Bleicher, G. W. Berger, Luftwissen, Vol. 10, No. 1, Jan., 1943, pp. 23-27.)
				Methods (Named Types).
609	6910	U.S.A.	...	*Douglas Jig Assembly of Tube Lines for Aircraft (Hydraulic, Fuel, etc.).* (Autom. Ind., Vol. 87, No. 10, 15/11/42, pp. 32-33, 74.)
610	7601	G.B. ...	...	*Avro Lancaster (Fuselage, Wing Tips and Trailing Portion).* (Airc. Prod., Vol. 5, No. 52, Feb., 1943, pp. 61-72.)
611	7602	G.B. ...	...	*Machining Hispano Cannon Components (Body and Breech Block).* (Airc. Prod., Vol. 5, No. 52, Feb., 1943, pp. 78-82.)
612	7606	U.S.A.	...	*Wright Engine Production (Cyl. Assemblies).* (F. C. Sheffield, Airc. Prod., Vol. 5, No. 52, Feb., 1943, pp. 89-96.)
613	7618	U.S.A.	...	*"Double Wasp" Test Cells at Ford Works.* (Inter. Avia., No. 844-845, 21/11/42, pp. 13-14.)
614	7630	Canada	...	*Mass Production of Canadian "Anson."* (Commercial Aviation, Vol. 4, No. 8, Aug., 1942, pp. 44-54.)
615	7755	U.S.A.	...	*How Vultee Uses Master Layout for Production.* (S. R. Carpenter, S.A.E., Preprint No. 3 (National Aircraft Production Meeting), Oct. 1-3, 1942.)
616	7771	Canada	...	*Mass Production of Wright Cyclone Engine.* (Canadian Av., Vol. 15, No. 11, Nov., 1942, pp. 68-74.)
617	7772	Canada	...	*Vultee Master Layout for Production (Loft Line of Continued Shapes and Common Reference Lines).* (S. R. Carpenter, Canadian Av., Vol. 15, No. 11, Nov., 1942, pp. 76-82.)
618	7775	U.S.A.	...	*Wright Engine Production.* (P. G. Sheffield, Airc. Prod., Vol. 5, No. 53, March, 1943, pp. 137-141.)
619	7777	U.S.A.	...	*Brewster Bermuda and Buccaneer (Production Method).* (Airc. Prod., Vol. 5, No. 53, March, 1943, pp. 147-148.)
620	7782	G.B. ...	...	*Avro Lancaster Production (III).* (W. E. Goff, Airc. Prod., Vol. 5, No. 53, March, 1943, pp. 111-120.)
621	7813	G.B. ...	...	*Ford Methods in Merlin Engine Production (Thread Rolling).* (Machinery, Vol. 62, No. 1,579, 14/1/43, pp. 29-33.)
622	7916	Germany	...	*Bibliography of Published Information on Organisation of GermanAircraft Industry and Production Methods* (1, *Organisation of Labour and Training;* 2, *Organisation of German Industry;* 3, *German Production Methods—General* (a, *Arado;* b, *Dornier;* c, *Heinkel;* d, *Henschel;* e, *Junkers);* 4, *Production of Engines).* (R.T.P.3, Bibliography No. 82, Ministry of Aircraft Production, March, 1943.)
623	8003	G.B. ...	...	*Light Alloy Foundry for Rolls Royce Merlin Castings (III).* (Airc. Prod., Vol. 4, No. 47, Sept., 1942, pp. 548-558.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
624	8005	G.B.	*Avro Lancaster Large Scale Production.* (Airc. Prod., Vol. 4, No. 47, Sept., 1942, p. 565.)
			Tools.
625	6850	U.S.A. ...	*Aircraft Tooling with Plastics.* (Engineer, Vol. 175, No. 4,544, 12/2/43, pp. 127-130.)
626	6854	G.B.	*Macrome Process of Treating Tools.* (Engineer, Vol. 175, No. 4,544, 12/2/43, p. 139.)
627	6975	G.B.	*Spindle Bearings of Machine Tools with High Speed.* (G. Schlesinger, J. Inst. Prod. Engs., Vol. 22, No. 1, Jan., 1943, pp. 1-39.)
628	7874	G.B.	*Insertion and Housing of Carbide Tools.* (Science Lib. Bibliog. Series, No. 585.)
629	8110	Germany ...	*Reduction of Material Required in the Construction of Machine Tools.* (W. Renthe, Der Betrieb, Vol. 21, No. 9, Sept., 1942, pp. 365-368.)
630	8112	Germany ...	*Reduction in Consumption of High Speed Tool Steels in Machining Operations.* (K. Englehard and W. Trapp, Der Betrieb, Vol. 21, No. 9, Sept., 1942, pp. 369-373.)
631	8114	Germany ...	*Cyaniding of High Speed Tool Steels.* (H. Schaumann, Der Betrieb, Vol. 21, No. 9, Sept., 1942, pp. 375-394.)
			Pipe Bending, Coupling and Tube Expanding.
632	6886	G.B.	*A Critical Examination of Pipe Couplings and Their Application.* (G. W. McArd, Mech. World, Vol. 114, No. 2,924, 15/1/43, pp. 53-56.)
633	6901	U.S.A. ...	*An Analytical Method for Determining the Flexibility of Piping having Two or More Anchorages.* (H. Miller, J. App. Mech., Vol. 9, No. 4, Dec., 1942, pp. 165-170.)
634	7717	U.S.A. ...	*Experimental Investigation of Tube Expanding.* (E. D. Grimison, the Annual Meeting of A.S.M.E., Nov.-Dec., 1942.)
635	8000	G.B.	*Pipe Bending (Blackburn Precision Process).* (Airc. Prod., Vol. 4, No. 47, Sept., 1942, pp. 535-536.)
			Templates and Tracings.
636	6915	U.S.A. ...	*Master Layouts for Production Use (Use of "Shrink" Machine for Transfers) (Digest).* (S. R. Carpenter, Autom. Ind., Vol. 87, No. 10, 15/11/42, pp. 47-48.)
637	6917	U.S.A. ...	*Template Duplication by Dry Offset Printing (Digest).* (W. A. Collins, J. T. Barnes, Autom. Ind., Vol. 87, No. 10, 15/11/42, p. 48.)
638	7778	G.B.	*Photo Tracings and Production.* (A. Betley, F. W. Coppin, Airc. Prod., Vol. 5, No. 53, March, 1943, pp. 107-108.)
			Inspection.
639	6889	G.B.	*Testing of the Continuity of Thin Tin Coatings on Steel.* (R. Kerr, J. Soc. Chem. and Ind., Vol. 61, No. 12, Dec., 1942, pp. 181-182.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
640	8008	G.B. ...	*Internal Inspection of Wing Structures (Foster Introscope).* (Airc. Prod., Vol. 4, No. 47, Sept., 1942, pp. 573-576.)
641	8117	Germany	*Layout and Equipment of the Factory Gauge Inspection Department.* (G. Tuttner, Der Betrieb, Vol. 21, No. 9, Sept., 1942, pp. 389-392.)
			Scrap Salvage.
642	6873	G.B. ...	*Scrap Identification Tests.* (Nickel Bulletin, Vol. 15, No. 11, Nov., 1942, pp. 163-165.)
643	6996	U.S.A.	*Rapid Identification of Scrap (including Spark Tests).* (J. Am. Soc. Nav. Engs., Vol. 54, No. 4, Nov., 1942, pp. 649-650.)
644	8007	U.S.A.	*Scrap Salvage at Boeing and Wright Plants.* (Airc. Prod., Vol. 4, No. 47, Sept., 1942, pp. 571-572.)
			Welfare.
645	8108	G.B. ...	*Prevention and Control of Hazards in the Radium Dial Painting Industry.* (L. F. Curtiss, J. Ind. Hyg. and Toxicol., 1942, Vol. 24, No. 6, pp. 131-141.) (Bull. of War Med., Vol. III, No. 5, Jan, 1942, p. 301.)
646	8109	U.S.A.	*Zinc Dermatitis (an Additional Hazard in the Aircraft Industry).* (H. E. Freeman, J. Amer. Med. Ass., 1942, Vol. 119, No. 13, July, 1942, p. 1,016.) (Bull. of War Med., Vol. III, No. 5, Jan., 1943, pp. 301-302.)
647	8139	G.B. ...	*Health in Industry.* (Nature, Vol. 151, No. 3,824, 13/2/42.)
			Road and Rail Transport.
648	6860	G.B. ...	*The First Gas Turbine Locomotive.* (A. Meyer, Engineering, Vol. 155, No. 4,022, 12/2/43, pp. 138-139.)
649	6935	France	*Electric Drive for Cycles.* (La Science et la Vie, Vol. 60, No. 291, Nov., 1941, p. 300.)
650	6948	G.B. ...	*Trailers for Transporting Aircraft Parts by Road.* (Engineering, Vol. 155, No. 4,023, 19/2/43, pp. 147 and 150.)
651	6953	G.B. ...	*The First Gas Turbine Locomotives.* (A. Meyer, Engineering, Vol. 155, No. 4,023, 19/2/43, pp. 159-160.)
652	7734	U.S.A.	*Progress Report Gas Turbine-Locomotive with Electrical Transmission.* (P. R. Sidler, Annual Meeting, A.S.M.E., Nov.-Dec., 1942.)
653	7737	U.S.A.	*Progress in Railway Mechanical Engineering* (1941-1942). Annual Meeting of A.S.M.E., Nov.-Dec., 1942.)
654	7821	G.B. ...	*Oil Electric Locomotives.* (E. C. Poultney, Engineer, Vol. 175, No. 4,546, 26/2/43, p. 173.)
655	7828	G.B. ...	*The First Gas Turbine Locomotive.* (A. Meyer, Engg., Vol. 155, No. 4,024, 26/2/43, pp. 179-180.)
656	8121	U.S.A.	*World's Largest Trailers for Transporting American Bombers.* (Flight, Vol. 43, No. 1,777, 14/1/43, p. 39.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
			Tank and Tank Warfare.
657	6910	G.B. ...	... *Churchill Tank (Photograph).* (Autom. Ind., Vol. 87, No. 10, 15/11/42, p. 52.)
658	6930	France	... *Flame Throwers in Tank Warfare.* (La Science et la Vie, Vol. 60, No. 291, Nov., 1941, pp. 257-258.)
659	6936	France	... *Methods of Anti-Tank Warfare.* (C. Rougeron, La Science et la Vie, Vol. 59, No. 285, May, 1941, pp. 379-388.)
660	7848	Germany	... *German Anti-Tank Mines.* (Flight, Vol. 43, No. 1,778, 21/1/43, p. 59.)
661	7893	Germany	... *The German 88 mm. Gun (Anti-Aircraft and Anti-Tank).* (J. C. Crockett, Coast Artillery J., Vol. 85, No. 5, Sept.-Oct., 1942, pp. 43-45.)
			Wireless and Electricity.
			Wireless and Radio Shielding.
662	6867	G.B. ...	... *The Speed of Travel of Wireless Waves.* (R. L. Smith-Rose, J. Inst. Elect. Engs., Vol. 90, Pt. 1, No. 25, Jan., 1943, pp. 31-38.)
663	6926	U.S.A.	... *Television Developments in the U.S.A.* (P. Hemardingner, La Science et la Vie, Vol. 60, No. 292, Dec., 1941, pp. 341-351.)
664	6938	G.B. ...	... *Tracing Valve Characteristics with the Cathode Ray Oscillograph.* (G. Bocking, Wireless Engineer, Vol. 19, No. 231, Dec., 1942, pp. 556-563.)
665	7634	U.S.A.	... *Aircraft Engine Radio Shielding.* (D. W. Randolph, J.S.A.E., Vol. 50, No. 12, Dec., 1942, pp. 538-541 and 548.)
666	7803	G.B. ...	... *Further Notes on the Electron Density Distribution of the Upper Ionosphere.* (O. E. N. Rydbeck, Phil. Mag., Vol. 34, No. 229, Feb., 1943, pp. 130-139.)
			Electricity.
667	6951	G.B. ...	... *Progress in Electrical Research.* (Engineering, Vol. 155, No. 4,023, 19/2/43, p. 156.)
668	7836	G.B. ...	... *Mechanism of the Electric Spark, Book Review.* (Nature, Vol. 151, No. 3,824, 13/2/43, pp. 178-180.)
669	7895	G.B. ...	.. *Intrinsic Electric Strength and Conductivity of Varnish Films and Their Variation with Temperature.* (A. M. Thomas and M. V. Griffith, J. Inst. Elect. Engs., Vol. 89, Pt. 1, No. 23, Nov., 1942, pp. 487-498.)
670	7896	G.B. ...	. . *Contact Non-Linearity, with Reference to the Metal Rectifier and the Carborundum Ceramic Non-Linear Resistor.* (A. Fairweather, J. Inst. Elect. Engs., Vol. 89, Pt. 1, No. 23, Nov., 1942, pp. 499-518.)
671	7958	Switzerland	... *Simple Method of Measuring High Voltages on Transformers (Leakage Flux).* (Electrical Times, Vol. 102, No. 2,364, 12/11/42, pp. 692-693.)
672	8144	G.B. ...	... *Evolution of Wire Telephony.* (Nature, Vol. 151, No. 3,825, 20/2/43, pp. 227-229.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
			Heat Transfer and Temperature Measurement.
673	7635	U.S.A. ...	*Design of Cross-Flow Heat Exchangers from Tested Core Sections.* (P. A. Scherer, J.S.A.E., Vol. 50, No. 12, Dec., 1942, pp. 542-548.)
674	7687	Germany ...	*The Engineer's Concept of Entropy.* (G. Newman, Stahl und Eisen, Vol. 62, No. 5, 29/1/42, pp. 89-91.)
675	7716	U.S.A. ...	*Studies of Heat Transmission Through Boiler Tubing.* (W. F. Davidson and others, A.S.M.E., Annual Meeting, Nov.-Dec., 1942.)
676	7720	U.S.A. ...	*Evaporation-Cooling Primer for Textile Management.* (H. M. Irons, A.S.M.E., Annual Meeting, Nov.-Dec., 1942.)
677	7723	U.S.A. ...	*Recent Developments in Spreader-Stoker Firing (Boilers).* (R. L. Beers, Annual Meeting of A.S.M.E., Nov.-Dec., 1942.)
678	7746	U.S.A. ...	*Measurement of High Temperatures in High Velocity Gas Streams.* (W. J. King, A.S.M.E., Preprint 19, Annual Meeting, Nov. 30-Dec. 4, 1942.)
679	7820	G.B.	*Chimney Loss Measurements without CO_2 Meters (Temp. Drop at Economiser).* (R. H. Parsons, Engineer, Vol. 175, No. 4,546, 26/2/43, pp. 165-166.)
680	7838	Germany ...	*Isentropic Changes of Condition of a Gas Undergoing Dissociation and the Method of Sonic Dispersion for the Study of Very Rapid Homogenous Gas Reactions.* (G. Damköhler, Z. fur Electrochemic and Ang. Physic, Cherme, Vol. 48, No. 3, March, 1942, pp. 116-131.)
681	7964	G.B.	*An Elementary Theory of Thermal Diffusion of Gases.* (R. Firth, Procs. Roy. Soc., Vol. 179, No. 979, 27/2/42, pp. 461-469.)
682	8011	G.B.	*Refrigerating Evaporators and Condensers.* (D. Gordon, Mech. World, Vol. 112, No. 2,920, 18/12/42, pp. 588-591.)
683	8096	U.S.A. ...	*The Influence of Pressure on Heat Transfer in Evaporation.* (M. Jakab, Procs. of the 5th International Congress for Applied Mechanics, 1939, pp. 561-564.)
684	8098	U.S.A. ...	*The Effect of Vibration on Heat Transfer by Free Convection from a Horizontal Cylinder.* (P. C. Martinelli and L. M. K. Boelter, Procs. of the 5th Internat. Congress for Applied Mechs., 1939, pp. 578-584.)
685	8099	U.S.A. ...	*Concepts of Efficiency of Heat Transfer and Pressure Drop Relations in Heat Exchangers.* (R. H. Norris, Procs. of the 5th Internat. Congress for Applied Mechanics, 1939, pp. 585-589.)
			Photography.
686	6876	G.B.	*High Speed Camera for Simultaneous Photographic and Oscillographic Records* (1,000 *frames/sec.*). (H. W. Baxter, J. Sci. Inst., Vol. 19, No. 12, Dec., 1942, pp. 183-185.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
687	8142	G.B.	*Photographic Sensitivity.* (S. O. Rawlings, Nature, Vol. 151, No. 3,825, 20/2/25, pp. 210-215.)
			Meteorology.
688	8052	U.S.A. ...	*On the Influence of Stability and Instability on the Wind Profile and the Eddy Conductivity Near the Ground.* (H. V. Sverdrup, Procs. of the 5th Internat. Congress for Applied Mechs., 1939, pp. 369-372.)
689	8053	U.S.A. ...	*On the Rôle of Isentropic Mixing in the General Circulation of the Atmosphere.* (C. G. Rossby, Procs. of the 5th Internat. Congress for App. Mechanics, 1939, pp. 373-378.)
690	8062	U.S.A. ...	*The Relation Between Wind Velocity and Height during a Thunder Storm.* (R. H. Sherlock, M. B. Stout, Procs. of the 5th International Congress for Applied Mechs., 1939, pp. 436-439.)
691	8131	U.S.A. ...	*Vapour Trails of Fortresses (Photograph).* (Flight, Vol. 43, No. 1,777, 14/1/43, p. 31.)
			Physiology and Aviation Medicine.
692	6890	U.S.A. ...	*Micro-Electrodes for Measuring Local Oxygen Tension in Animal Tissues.* (P. W. Davies and F. Brink, Rev. of Scientific Insts., Vol. 13, No. 12, Dec., 1942, pp. 524-533.)
693	7942	G.B.	*The Prevention of Eye Injuries.* (R. G. Meyer, Airc. Eng., Vol. 15, No. 168, Feb., 1943, pp. 59-60 and 58.)
694	8013	Germany ...	*The Effects of Acceleration on the Blood Volume of the Heart, Illustrated by Means of X-Ray Ciné-Photographs (Kymograms).* (H. Peiffer, Luftfahrtmedizin, Vol. 3, No. 2, 1938-9, pp. 82-95.)
695	8014	Germany ...	*The Capacity for Work at High Altitudes.* (A. Koch, L.F.M., Vol. 3, No. 2, 1938-9, pp. 97-103.)
696	8015	Germany ...	*The Comparative Effects of Low Pressure and Oxygen Deficiency on the Human Organism. (I) Study of Physical Well-Being and Respiration.* (D. Hartman, L.F.M., Vol. 3, No. 2, 1938-9, pp. 117-123.)
697	8016	Germany ...	*The Position of the Body and its Effect on Altitude Tolerance.* (E. Schafer, L.F.M., Vol. 3, No. 2, 1938-9, pp. 257-266.)
698	8017	Germany ...	*Comparative Studies of Stereoscopic Vision by Means of the Cords Space-Sense Apparatus, the Zeiss Stereoscope and Pulfrich Test Diagrams.* (H. Ziegler, L.F.M., Vol. 3, No. 2, 1938-9, pp. 302-308.)
699	8018	Germany ...	*The Rôle of the Electro-Cardiogram in Examining Candidates for Flying Fitness.* (F. Brauch, L.F.M., Vol. 3, No. 1, 1938-9, pp. 1-7.)
700	8019	Germany ...	*CO_2 and O_2 Additions for High Altitude Breathing.* (J. Jongbloed and A. J. Waldschut, L.F.M., Vol. 3, No. 1, 1938-9, pp. 8-11.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
701	8020	Germany ..	*The Blood Flow in the Internal Carotid Artery as Affected by Breathing CO_2 Under Conditions of Oxygen Want.* (Th. Benzinger, L.F.M., Vol. 3, No. 1, 1938-9, pp. 46-54.)
702	8107	G.B.	*Transportation of Patients by Aeroplane.* (W. R. Lovelace and J. Hargreaves, J. Av. Med., 1942, Vol. 13, No. 1, pp. 2-25.) (Bull. of War Medicine, Vol. III, No. 5, Jan., 1943, pp. 299-300.)
703	8143	G.B.	*Physiology of Colour Vision.* (E. N. Willmer, Nature, Vol. 151, No. 3,825, 20/2/43, pp. 227-229.)
704	8179	Germany	*Aviation Medicine Helps the War.* (D. Hippke, Luftwissen, Vol. 10, No. 1, pp. 3-5, Jan., 1943.)
			Mathematics.
705	6870	U.S.A. .	*Mechanical Multiharmonograph (Graphing Functions and Solutions of Non-Linear Simultaneous Equations).* (S. L. Brown and L. L. Wheeler, Rev. of Sci. Insts., Vol. 13, No. 11, Nov., 1942, pp. 493-495.)
706	8083	U.S.A. .	*The Reduction of the Solution of Certain Partial Differential Equations.* (H. Poritsky, Procs. of the 5th Internat. Congress for Applied Mechanics, 1939, pp. 700-707.)

ABSTRACTS FROM THE SCIENTIFIC AND TECHNICAL PRESS.

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Approximate Formulæ for the Pressure and Density of the Air at Great Altitudes. (F. Haber, Z.V.D.I., Vol. 86, No. 25-36, 5/9/42, p. 555.) (111/1 Germany.)

Up to an altitude of 11 km. the standard atmosphere with a temperature gradient of $-6.5°$C. per km. is represented by

$$\frac{p_H}{p_o} = (1 - 6.5/288\,H)^{5.255} \quad . \quad . \quad . \quad . \quad (1)$$

$$\frac{\rho_H}{\rho_o} = (1 - 6.5/288\,H)^{4.255} \quad . \quad . \quad . \quad . \quad (2)$$

Above 11 km. (Stratosphere) the temperature is assumed constant ($-56.5°$C.) and

$$\frac{p_H}{p_{11}} = \frac{\rho_H}{\rho_{11}} = e^{-.1575\,(h-11)} \quad . \quad . \quad . \quad . \quad . \quad (3)$$

where

H = altitude in km.

p = pressure, ρ = density } of air.

These accurate expressions are rather cumbersome and for many purposes can be replaced by the following simple approximations.

$$\frac{p_H}{p_o} = \left\{ \frac{(31-H)}{(31+H)} \right\}^2 \quad . \quad . \quad . \quad . \quad . \quad . \quad (1a)$$

$$\frac{\rho_H}{\rho_o} = \frac{(20-H)}{(20+H)} \quad . \quad . \quad . \quad . \quad . \quad . \quad (2a)$$

$$\frac{p_H}{\rho_o} = \frac{\rho_H}{\rho_{11}} = \left\{ \frac{(37-H)}{(37+H)} \right\}^2 \quad . \quad . \quad . \quad . \quad . \quad (3a)$$

The above approximations are obviously accurate at the origin.

The errors are generally less than ± 2 per cent., as will appear from the following table:—

1 (*a*) -2 per cent. at 5 km.
o at 9.5 km.
$+1.5$ at 11 km.

2 (*a*) $-.5$ per cent. at 3 km.
o between 6 and 8 km.
$+2$ per cent. at 11 km.

3 (*a*) $+1$ per cent. at 15 km.
o at 18 km.
-4 per cent. at 21 km.

Heat Transfer to a Fluid Flowing Periodically at Low Frequencies in a Vertical Tube. (R. C. Martinelli and others, A.S.M.E. Preprint, April 21-28, 1943.) (111/2 U.S.A.)

There are available in the literature many data for the transfer of heat from a tube to an enclosed fluid flowing with steady, unidirectional motion. Knowledge with respect to the applicability of such steady flow data to the analysis of heat transfer from a pipe to a fluid, the velocity of which is a periodic function of time, is necessary for the solution of certain types of heat-transfer problems. An outstanding example of a system in which such periodic heat transfer occurs is the internal combustion engine, under detonating and non-detonating conditions. The experiments described in this paper are the beginning of a long-range programme on the subject of heat transfer in the cylinders of internal combustion engines and, although the results of the tests are not immediately applicable to engine analysis, some light is shed on the phenomenon.

The results may be summarised as follows: For the type of velocity variation utilised in these experiments it is shown that steady unidirectional flow heat transfer results may be utilised to predict heat transfer performance under conditions of periodic flow:—

(*a*) As a first approximation the steady flow data may be utilised directly, replacing Re_m by $\tilde{R}e_m$ and obtaining $\tilde{N}u_{lm}$ from the steady unidirectional flow curve.

In the above

Re_m = Reynolds modulus for steady unidirectional flow, based on fluid properties at arithmetic average of mixed-mean fluid temperature at entrance and exit, t_m.

$\tilde{R}e_m$ = Reynolds modulus for periodic flow, properties evaluated at t_m.

$\tilde{N}u_{lm}$ = Nusselt modulus for periodic fluid flow, based on logarithmic mean temperature difference between tube wall and fluid, the thermal conductivity being measured at t_m.

(*b*) For a more precise and rational method, the steady unidirectional fluid flow data may be utilised to predict instantaneous magnitudes of the Nusselt modulus at any point in the cycle of velocity variation. The time average Nusselt modulus may then be obtained by graphical integration.

Relationship Between Reynolds Number and Turbulent Velocity Distribution in a Pipe. (L. S. Rhodes, J. App. Mech., Vol. 10, No. 1, March, 1943, pp. 21-22.) (111/3 U.S.A.)

The author assumes that the velocity distribution can be represented by

$$u = CV\left(\frac{y}{R}\right)^n$$

where
u = velocity at distance y from wall.
R = radius of pipe.
V = mean velocity.
CV = maximum velocity (at centre).

By integrating the flow, it can easily be shown that

$$C = \frac{(n+1)(n+2)}{2}$$

The shearing stress at the wall is given by

$$\tau = \left(\frac{D}{4}\right)\left(\frac{dp}{dl}\right); \left(\frac{dp}{dl}\right) = \text{pressure gradient})$$

$$\frac{dp}{dl} = \lambda\,(1/D)\,\tfrac{1}{2}\rho V^2$$

and experiment shows that λ, the so-called friction coefficient is only a friction of the Reynolds number VD/Y, *i.e.*,

$$\lambda = k\left(\frac{VD}{Y}\right)^m$$

Therefore

$$\tau = \left(\frac{\lambda}{8}\right)\rho V^2$$

Substituting for λ and V, this becomes

$$\tau = \left(\frac{k\rho^{m+1}D^m}{8\mu^m}\right)\left(\frac{u^{m+2}D^{mn+2n}}{C^{m+2}\,(2\,y)^{mn+2n}}\right)$$

Assuming now that the shear at the wall is identical with the skin friction on a flat plate, τ must be independent of D. (Abstractor's Note rules out laminar flow.)

$$\therefore\ mn + 2n + m = 0,$$

$$i.e.,\ n = \frac{-m}{(2+m)}$$

Thus the velocity distribution corresponding to a given V depends only on "m" which is accurately known from the experiments on friction losses in pipes.

For a given velocity distribution, the kinetic energy passing a given section per second is easily obtained by integration.

This energy is E times the kinetic energy if all the fluid particles moved at the mean speed V where

$$E = \frac{\{(n+1)^3\,(n+2)^3\}}{\{4\,(3n+1)\,(3n+2)\}}$$

Then if $n = 1/9$ (flow in cast pipes)

$$E = 1.038.$$

The practical value of E will be somewhat larger, since the above only takes axial motion into account.

Effect of a Rotating Cylinder Placed in the Nose of an Aerofoil on its Aerodynamic Characteristics. (E. B. Wolff and C. Koning, Rykstudiedienst Voor Luchtvaart, Vol. 3, 1925, Rept. 96A; Vol. 4, 1927, Reports 98A, 105A and 130A.) (111/4 Holland.)

The experiments were carried out on an aerofoil of 1,000 mm. span, 200 mm. chord of maximum thickness, 37 mm. approximately in ships to Goettingen 386

(flat bottom surface). The rotating cylinder (diameter 37 mm.) spans the whole of the model, its axis being placed approximately 34 mm. from the nose. The wing is provided with an internal shield surrounding the cylinder with a small gap (.5 mm.).

This shield is cut away at the top and bottom surface of the wing leaving a gap of about 13 mm. where the cylinder replaces the normal wing surface.

The front portion of the shield forming the aerofoil nose is detachable. Without it, the aerofoil shape is altered to one with a cylindrical nose. Under these conditions about half the cylindrical surface now becomes effective as wing contour.

Lift and drag measurements were carried out in the usual manner, both with and without nose for various speed of rotation of the cylinder. The power required to drive the cylinder was not determined. The effect of cylinder clearance (internal shield) was also investigated. The polar diagrams were compared with those obtained with standard or slotted wings or freely rotating cylinders. The principal conclusions may be summarised as follows:—

1. Rotation of the cylinder may raise the critical angle from 14° (corresponding to the normal Goettingen 386 profile) to about 42°. Under these conditions the maximum lift coefficient becomes 2.43 compared with 1.28, *i.e.*, an increase of over 90 per cent.

2. Such large increases in lift are only possible if the detachable nose shield is removed, so that about half the cylinder surface becomes effective. With the nose in position, the shift in the critical angle is reduced to 7° and the maximum lift coefficient is now 1.45, *i.e.*, an increase of 16 per cent. only.

3. To obtain the above results, the ratio of circumferential speed of cylinder to air speed U must be of the order of 4/1 (1,700 r.p.m. for a wind speed of 8 m./sec.). Beyond this speed ratio, the increase in lift is very small. At lower U/V values, the maximum lift coefficient obtainable falls off rapidly 1.8 for $U/V=2$ and 1.4 for $U/V=1.3$.

4. The beneficial results noted above also depend on the maintenance of very close clearance between cylinder and internal shield ($\sim$ .5 mm.). Increasing the gap to 1.5 mm. reduces the lift coefficient appreciably, especially at low U/V values.

   Thus at $U/V=2$, the lift coefficient falls from 1.7 (clearance .5 mm.) to .7 (clearance 1.5 mm.) the incidence being 20° in each case.

5. Whilst there is no doubt that the rotating cylinder enables high lift coefficient to be maintained at incidences well beyond those possible with slotted wings, the corresponding drags are very large ($\sim$ .7). If comparison is made at lift coefficients just possible with slotted wings ($\sim$ 2.1), the drag of the cylinder wing is at least 50 per cent. greater.

6. The author finally compared the polar diagram of the cylinder wing with that obtained for the rotating cylinder alone. In both cases the reference area is the projected area of the cylinder. As was to be expected, for the same drag coefficient the lift coefficient with aerofoil is about 50 per cent. higher than for the free cylinder.

7. A velocity survey with a hot wire anemometer at a distance of 5 mm. from the surface of the aerofoil showed that an appreciable momentum is imparted to the air by the rotation of the cylinder.

8. It was proposed in subsequent experiments to investigate the effect of a change in position of cylinder as well as shape of aerofoil. The effects of surface roughness of the cylinder were also to be determined.

ABSTRACTOR'S NOTE.—No further results were published.

The Motions of a Viscous Fluid Produced by the Slow Rotation of Two Circular Cylinders Placed Eccentrically in the Fluid. (W. Muller. Z.A.M.M., Vol. 22, No. 4, August, 1942, pp. 177-189.) (111/5 Germany.)

The author has investigated in two previous papers the two-dimensional motion produced by the slow rotation of two circular cylinders, finite solutions being obtained both for the stream function and the viscous forces acting on either cylinder (inertia terms are neglected). The first of these papers (Ing. Arch., Vol. 13 (1942), pp. 37-58) deals particularly with the case of a bearing, *i.e.*, the effect on the rotating journal is studied. In the second paper (Ann. Phys., Vol. 41 (1942),pp. 335-354) attention is paid to the torque transmitted by a rotating cylinder on a second cylinder suspended inside it (viscometer problem). The theory is, however, not limited to this case and applies equally well when the cylinders are external to each other or if one cylinder becomes a plane. The present paper deals more particularly with the case of both cylinders rotating either in the same or opposite direction. The system of bipolar curved co-ordinates already previously used is retained as being the most convenient for this type of investigation.

Some special cases of interest are worked out in detail. These include:—

(1) Cylinders rotating in opposite direction, the smaller being placed eccentrically inside the larger and its angular velocity ratio being such that the flow through any cross-section of the annular space between the cylinders is zero.

The corresponding stream lines are given, including the special case when the outer cylinder degenerates into a flat plate.

(2) Investigation of condition for the absence of any force acting on the cylinders, *i.e.*, only torques are transmitted.

In the case of concentric cylinders this torque is given by

$$4\pi u\,(w_1 - w_2)\,\frac{(r_1^2 r_2^2)}{(r_2^2 - r_1^2)}$$

when $\left.\begin{matrix} w_1 \\ w_2 \end{matrix}\right\}$ = angular velocities of two cylinders.

$\left.\begin{matrix} r_1 \\ r_2 \end{matrix}\right\}$ = corresponding radii.

In conclusion, the author indicates a possible method for including inertia terms in the general solution. This would be of interest in the case of journal friction, but the mathematical difficulties have so far not been overcome.

Aerodynamic Forces on a Harmonically Vibrating Wing in a Supersonic Field (Two-Dimensional Case). (S. Borbely, Z.A.M.M., Vol. 22, No. 4, August, 1942, pp. 190-205.) (111/6 Germany.)

The author considers bending and torsional vibrations of a two-dimensional wing, neglecting friction of the air on the assumption that the additional velocities u and v are always small compared with the incident flow velocity U. This implies the following:—

1. The wing incidence and amplitude of vibration are both small, and the frequency of the vibration is low.
2. The wing profile has sharp edges and the inclinations of the tangents to the contour are throughout small.

The author shows that under these conditions the field of flow produced by the vibrating wing is made up of two parts:—

1. A steady field, corresponding to the flow at the mean incidence of the vibrating wing and depending on the curvature and thickness of the profile.

2. An unsteady harmonic field, corresponding to the flow about a two-dimensional plate of the same chord and vibrating symmetrically with regard to the current with the same frequency and amplitude as the original wing.

This field is thus independent of the shape and angle of incidence of the original wing.

The resultant aerodynamic forces acting on the wing can be obtained by superposition of the forces due to the two individual fields. The steady portion has already been investigated by Prandtl, Ackeret and Busemann, and may be considered as known.

The author deals more specifically with the unsteady field associated with the vibrating plate originally at zero incidence. After linearising the general differential conditions and inserting the boundary conditions appropriate to the problem, the field of flow associated with a vibrating pressure point is obtained in terms of Haken (special class of Cauchy) integrals. The complete field is then obtained by combining a suitable number of pressure points. In an appendix the author shows how the same method can also be applied to the steady field. The results are identical with those already obtained by Ackeret. It is interesting to note that while in the case of incompressible flow, the forces on the wing depend on the relative motion of different points in the wing surface (rear and forward neutral point and centre), in the case of supersonic flow the motion of the leading edge alone is of importance.

The Theory of the Lifting Wing. (J. Nikuradse and E. Mohr, L.F.F., Vol. 20, No. 2, 27/2/43, pp. 48-56.) (111/7 Germany.)

The authors demonstrate that under given incident flow conditions, the forces on an aerofoil depend only on the characteristics of the trailing vortex sheet, i.e. on the potential flow due to this sheet at a considerable down-stream distance.

In analogy with the Karman vortex street associated with the two-dimensional problem, it is further assumed that this sheet moves as a rigid surface at a sufficiently large distance from the wing. Under these conditions, the generalised impulse theorem leads to a minimum kinetic energy of the lateral flow, i.e. a minimum of wing drag. In the case of symmetrical flow and a straight trailing edge, this corresponds to an elliptic lift distribution on the wing. The most favourable geometrical shape of the vortex sheet shed by a wing of a given plan and carrying the least energy for a given impulse is thus a flat plane, i.e. the trailing edge of the wing must be straight. This is the only factor which theory indicates as essential. All the other form parameters of the wing must be determined by experiment.

Influence of Cross-Sectional Area of the Surge Chamber on the Fluctuation of the Water Level During Inflow Control of Hydraulic Turbines. (W. Richter, Ing. Archiv., Vol. 13, No. 6, 1943, pp. 331-342.) (111/8 Germany.)

In order to prevent large pressure changes in the piping system of a hydraulic turbine when the rate of water flow is suddenly altered, it is usual to install a damping capacity or surge chamber at the end of the conduit from the reservoir and immediately in front of the head race.

The author obtains the differential equation of the unsteady motion between the reservoir and surge chamber by assuming one-dimensional flow along a stream line and introducing the necessary terms for resistance and damping, which are both assumed to vary as the square of the effective speed. Of special interest is the graphical method of solution by means of a nomogram which gives the change of level associated with a given flow control as a function of the area of cross-section of the surge chamber.

The method is illustrated by a worked-out example both for the case when the flow is stopped suddenly or reduced gradually.

The advantages of a surge chamber with discontinuous variation in cross-section are discussed.

The method can also be applied if the damping and resistance are assumed to follow other than the square law.

Technical Problems of High Altitude Flight. (G. Caproni, Der Flieger, Vol. 12, No. 5, January, 1939, pp. 168-169.) (111/10 Italy.)

Two types of high altitude flight exist at the moment. In the first the object is to reach the quickest possible altitude and this necessitates designing a machine with a great rate of climb but indifferent speed and controllability. Quite different considerations, however, apply if for economic or military reasons, high speeds are to be achieved at a great altitude. For altitude record purposes, it appears that the biplane offers the best solution for providing the necessary wing area at its lowest weight and the author cites the Caproni 161 as a case in point. High speed flight at a great altitude presents considerably greater difficulties. Here the wing area must be cut down and the engine power required becomes very large. Although supercharging by means of an exhaust turbine represents a feasible solution up to about 10,000 m., the efficiency of this method rapidly diminishes at greater altitudes and this together with the drop in airscrew efficiency necessarily associated with high speed operation explains the interest in the alternative methods of jet propulsion which alone seems to offer any prospects of high speeds being maintained at really great altitudes. Even if, however, the necessary propulsive thrust becomes available very little is as yet known about the wing section and fuselage form required for minimum drag at speeds approaching sonic values.

The author finally touches on physiological problems associated with high altitude flight and states that the Guidonia Institute have developed a pressure suit giving complete satisfaction. The design of a satisfactory pressure cabin on the other hand is still in its infancy. It is interesting to note that according to the author repeated ascents to higher altitudes without adequate protection are harmful in a cumulative sense, the resistance of the pilot diminishing with each flight.

Technique to Shorten Take-offs and Landings. (R. de H. Williams, Aviation, Vol. 42, No. 1, Jan., 1943, pp. 94-95, 313-319.) (111/11 U.S.A.)

The author, who is test pilot of the Bœing Aircraft Company, assumes that the ground friction coefficient remains constant during the run. The calculations apply to a conventional monoplane and ground effect is taken into consideration and yield the following conclusions:—

1. Three point take-off will yield the shortest ground ($\mu > .04$) run on most commonly used surfaces, except very smooth concrete runways ($\mu > .02$). In the latter case, a high tail altitude (zero lift) is beneficial.
2. Minimum landing roll is obtained when the landing is made three point and the roll continued in a tail-high altitude, applying the brakes as much as possible without skidding the tyre or overthrowing the aircraft. (This type of landing should be regarded as an emergency manœuvre only.)

Removing Snow from Runways. (H. L. Hunt, Aviation, Vol. 42, No. 1, Jan., 1943, pp. 98-99, 263, 332, 335-342.) (111/12 U.S.A.)

There are several methods of removing snow from runways, but the most favourable employ machines that pick up the snow and deposit it well away from the used areas. This is achieved by first banking up the snow with special ploughs and subsequently distributing it well away from the used areas. Several

types of these machines are described, including a recent model in which plough and motor are combined in one unit. Rotary blowers will blow the snow 50 to 90 ft. with or 40 ft. against a moderate wind. They are useless, however, in case of a storm. The snow should be cleared to the full width of the runway and to beyond the contact lights. Banks at the edge should be sloped not more than 3/100 to prevent damage to plane and prevent forming traps to drifting snow. Rolling the snow outside the cleared areas will reduce drifting. The snow should be cleared as close to its runway as possible. Surface ice can be dealt with by means of special scrapers or rendered skid proof by spreading hot sand. Cinders previously soaked in brine are also used for this purpose. The centre of the runway should be painted with a contrasting stripe to guide its pilots.

Although aircraft can land and take off successfully in 6 to 8 ins. of dry snow, moist snow is very treacherous, especially if low pressure tyres are fitted.

Airport managers agree that the runways should be kept clear of snow at all times; at a Canadian training field, 15 aircraft swerved from the runways during two months, involving damage to the extent of 250,000 dollars. These runways had been compacted by rolling but not cleared of snow. It is reckoned that over three-quarters of this sum could have been saved if equipment allowing complete snow removal had been available on the spot. To be of use, such equipment must be in good condition. Thus on a typical Canadian airport, 52 ins. of snow fell during the month of January alone. Keeping the runways open during the month required that a tractor hauling rollers operated 453 hours, a rotary blower 412 hours, and a plough 386 hours. In one period the tractor operated 12 days, the blower eight days and the plough for nine days in succession with only service stops. The cost of such equipment, although high, is negligible compared with the possible saving in lives and machines.

Rocket Power for Assisted Take-Off. (R. Healey, Aviation, Vol. 42, No. 1, Jan., 1943, pp. 100, 221-223.) (111/13 U.S.A.)

Recent tests carried out in the U.S.A. on commercial powder rockets show that a rocket weighing about 1.5 lb. (.5 lb. of explosive charge) can produce a thrust of about 15 lb. for 3 seconds. Opel in his 1929 tests, is stated to have obtained a thrust of 53 lbs. for 25 seconds with a 10 lb. charge. Other experiments have claimed thrusts up to 600 lb. for 3 seconds with larger charges. Extrapolating from these results, the author concludes that a charge of 12.5 lb. of black powder should be capable of maintaining a thrust of 200 lb. for 5 seconds. By firing ten of these charges simultaneously, followed after 5 seconds by combustion of a further 10 charges, a thrust of 2,000 lb. for 10 seconds would be realised to accelerate the aircraft over the first 50 m.p.h. of its speed range. This would either materially shorten the take-off run for a given load or alternatively enable an excess load to be carried for the same length of runway. It is stated that the Ju 88 is enabled to carry an excess load of 3,000 kg. by making use of this method. It is estimated that the individual weight of the black powder rocket would be of the order of 17.5 lb. (charge weight 12.5 lb.). As the charges become exhausted the casing would be dropped from the aircraft. The average increase in weight during the assisted portion of the take-off will then be less than 200 lb. Using smokeless powder or nitro cellulose explosives, a considerable further reduction in weight of the installation should be possible. On account of its simplicity, this method of assisted take-off deserves attention.

Detachable Fuel Tanks of Moulded Plywood. (Aviation, Vol. 42, No. 1, Jan., 1943, p. 163.) (111/14 U.S.A.)

The Vidal Research Corporation have developed a series of auxiliary fuel tanks made of moulded plywood and ranging from 50 to 160 gallons capacity. These tanks are of streamline shape and installed under the wing or fuselage. They

can be quickly jettisoned without interrupting the normal fuel supply. A photograph of the tank is given in the article.

In the construction of these tanks, a large number of veneers are employed which are patterned in a special manner so as to render the tank leak proof.

The main difficulty appears to be the dynamic load due to sloshing of the fuel, which necessitates the fitting of specially balanced internal baffles.

Photographic Method for Investigating Short Period Rolls of Photographic Reconnaissance Aircraft. (M. Nagel, Luftwissen, Vol. 10, No. 2, Feb., 1943, pp. 36-37.) (111/15 Germany.)

Lack of definition of aerial photographs is produced by the motion of the image during the time of exposure. Under bad conditions of visibility, relatively long exposure times must be given and the question naturally arises whether the employment of special low speed aircraft would prove beneficial.

Whilst this would naturally reduce the so-called regular displacement error, other factors, such as course stability and angular velocity of roll of the aircraft during the exposure interval, also affect the image travel and may become more important in the case of low speed aircraft (gust sensitivity).

The author has investigated this problem by taking long exposure photographs of a suitable ground object (4 × 4 m. white cloth placed at the centre of a large meadow), the camera being mounted rigidly in the aircraft. Sample photographs taken from an altitude of 1,500 m. (exposure 3 seconds) give information as to course stability and roll. Similar records from a lower altitude give the small amplitude displacements due to camera vibration.

It is thus possible to investigate the suitability of various aircraft types for photographic work and also obtain information on the relative skill of different pilots in maintaining course.

The short period rolls affecting image displacement are usually of the order of 1 vibration/sec.

Camera vibrations, mainly induced by the engine, have a much higher frequency (~20 vibrations/sec.).

These transverse vibrations are difficult to allow for on the final negative and means must be taken to reduce them to the utmost by suitable choice of aircraft and installation of camera.

The regular displacement due to the translation of the aircraft in a straight line on the other hand presents no difficulty to the computor. If necessary it can be considerably reduced by swinging the camera automatically at the required speed so that the image remains almost stationary on the film.

Calculation of Diving Speeds. (E. Kenner, Luftwissen, Vol. 10, No. 2, Feb., 1943, pp. 51-52.) (111/16 Germany.)

It is assumed that the aircraft dives at a constant angle ϕ, the propeller exerting a constant thrust S. At the beginning of the dive (altitude H) the aircraft has zero vertical velocity. Throughout the dive the weight G and resistance coefficient c_w of the aircraft are constant.

Under these conditions, the speed of the aircraft will accelerate till a certain lower altitude h is reached. Subsequent to this, the diving speed decreases.

The critical altitude h corresponding to maximum diving speed is given by

$$h = H - \frac{(G \sin \phi)}{(F c_w \rho_h)}$$

where ρ_h = density at altitude h.
F = wing area.

Assuming a standard atmosphere

$$\rho_h = \rho_o \left(\frac{b}{b_o} \right)$$

where

$$\left(\frac{b}{b_o}\right)=\left(1-\frac{ah}{T_o}\right)^{1/aR}$$

In the above

a = lapse rate = .0065°C./m.
ρ_o = standard ground density.
= 1.226 kg./m.^{3} at $T_o = 288°C_A$.

Similarly h can be expressed as a function of b/b_o and we then obtain for the critical altitude.

$$\left(\frac{T_o}{a}\right)\left[1-\left(\frac{b}{b_o}\right)^{aR}\right]=H-\left(\frac{G\sin\phi}{Fc_w\rho_o}\right)\left(\frac{b}{b_o}\right)$$

where $R = 29.27$ = gas constant.

This equation can be solved graphically for (b/b_o) and h determined.

The maximum diving speed v_m then follows by substituting the appropriate value for h in the equation

$$v_m=\left\{\frac{(G\sin\phi+s)}{\rho_o F c_w}\right\}\times 2g\times\left(1-\frac{ah}{T_o}\right)^{-1/aR}$$

For lower values of h, v slowly diminishes.

A worked out example considers the vertical dive of an aircraft with the following characteristics:—

G = 2,000 kg.
F = 16 m.^{2}.
S = 100 kg.
c_w = .12.

The dive starts at 8,000 m. A maximum velocity of 197.3 m. is reached at an altitude of 6,242. After this the speed drops almost linearly to 140 m./sec. at 1,000 m.

Physiological Problems of Long Distance and Night Flying. (F. Ruff, Luftwissen, Vol. 10, No. 2, Feb., 1943, p. 61.) (Digest of Lilienthal Lecture.) (111/17 Germany.)

Long distance flights subject the crew to considerable fatigue and this will affect fighting capacity should the aircraft be attacked. Three factors accelerate fatigue: cramped quarters, noise and vibration.

The so-called " comfortisation " of military aircraft is at last receiving attention. It is not enough to provide a seat and expect that this necessarily implies rest. Continuous contraction of any muscle to hold the body in a required position must be avoided. Much has been done as regards the pilot in providing adjustable seats and placing all the controls in suitable positions. The remainder of the crew deserves equal attention, especially as regards vibration. Modern research has shown that the frequency of such vibration as well as their amplitude have pronounced physiological effects. Thus for horizontal seat vibrations up to .5/sec. the body executes parallel vibrations as a whole. At .6/sec. the head begins to lag behind and may get into resonance at about 1.6/sec. At higher frequencies the node travels downwards along the spine, till at frequencies above 4/sec. only the seat takes part in the motion. In the case of vertical seat vibrations, eye resonance may be set up and this will render ground observation difficult. Apart from these mechanical effects, continuous exposure to vibration may produce grave disturbances of the nervous system and the failure of reflexes.

The problem of vibration thus deserves the closest attention in assessing the comfort of the crew and their resistance to fatigue.

The effect of noise in producing fatigue is well known and elaborate precautions are taken in civil aircraft to combat noise. In the case of military aircraft, the simplest solution is the provision of comfortable sound insulating helmets fitted with headphones.

Night flying presents a special problem. The success or failure of a night combat depends largely on which of the two combatants sees the other first. Acuteness of vision under such circumstances varies considerably for different individuals. It must be the object of physiological tests to select suitable candidates and weed out individuals suffering from so-called "nightblindness," i.e. lack of response of the retina rods to low intensity stimulæ. For the normal individual, the rod response will increase up to 100,000 times if the eye is kept unstimulated with maximum pupil diameter over a period of 30-40 minutes. Unfortunately this adaptation is completely destroyed by a bright light, such as a gun flash or tracer ammunition. For well camouflaged aircraft, therefore, night fighting is necessarily restricted to a short gun burst, after which contact is lost through inability of either side to see the other.

Even the internal illumination of the aircraft instruments may have a serious effect in reducing night adaptation. By employing luminescent paints of a suitable colour, the danger to the observer can be considerably reduced.

The importance of frequent tests of the night vision of observers is stressed. Correct diet is of importance in maintaining this faculty.

Calculation of Power Required for Operating a Variable Camber Wing Flap. (K. Wolf, Luftwissen, Vol. 10, No. 2, Feb., 1943, pp. 53-57.) (111/18 Germany.)

The flap under consideration retracts a distance of 1.275 m., undergoing a simultaneous change in incidence from $+40^\circ$ to -7°. The force required to overcome friction and air drag at any position is given. Not counting inertia, this force varies from 1,080 kg. (fully extended) to 60 kg. (retracted) for each flap. Each flap is mounted on two platforms running on rails and inter-connected by a cable and pulley system so as to cause the platforms to move in or out together when the top cable is pulled to the left or right.

This pull is exerted by a tie rod bridging the space between the two flaps and passing through a hollow internally threaded spindle, which in turn is rotated by an electric motor fed by the aircraft system (24 volts D.C.). The author discusses in detail the size of motor and type of gearing required for this method of flap operation, taking into account both inertia effects and starting from rest. All the pertinent factors such as friction in worn gear and temperature rise of motor are fully allowed for, and it is finally concluded that a Bosch reversing motor Type KM/RE800 with a speed range up to 6,000 r.p.m. and a maximum output of 1,000 watt comes nearest to fulfilling the required conditions, the gear ratio between motor and spindle being 10.9/1 and the pitch of the spindle 6 mm.

Under these conditions the current varies from 106 to 21 amps during retraction, the corresponding speed change of the motor being from rest to 6,000 r.p.m. The total time of operation is about 35 seconds.

Since the air forces assist during extension of the flap, the same motor will easily suffice for this purpose.

Methods for Balancing Airscrews. (H. Oschatz, Luftwissen, Vol. 10, No. 3, March, 1943, pp. 69-73.) (111/19 Germany.)

Airscrew unbalance may be due to three causes:—

1. A displacement of the C.G. from the axis of rotation (so called static unbalance).
2. Lack of coincidence of principal axis of inertia with axis of rotation. Even if there is static balance (in which case the axis of rotation cuts the inertia at the C.G.) an unbalanced couple remains.
3. Aerodynamic unbalance due to differences in the aerodynamic blade loads. This causes a couple which rotates with the airscrew and acts about an axis in the plane of rotation and at right angles to the axis of rotation of the airscrew.

Static unbalance is easily cured by the provision of a suitable counterweight in the C.G. plane. Similarly any unbalanced couple can be eliminated by the provision of two equal masses in different planes. In the general case where both defects are present, cure is provided by two unequal masses situated in different planes and dynamic balancing, machines are available for carrying this out rapidly and accurately, providing care is taken to avoid slip stream effects. This necessitates an overhung shaft and stream lining of driving mechanism.

In the absence of aerodynamic unbalance, the balance weights will retain their effect over the whole range of speed and load.

If, however, aerodynamic unbalance is present, the compensation is only possible over a limited range, since the mechanical unbalance produced by the aerodynamic load varies in a complicated manner with effective blade incidence. As a result, the blades although balanced under load may be statically out of balance when the airscrew is at rest.

For this reason, the author considers it essential that the aerodynamics unbalance be measured separately and for this purpose recommends the Hamilton screen method described by Beebe and Mueller, Aero Digest, 1941, No. 2-5. The screen consists of permeable cloth stretched on a conical frame placed behind the propeller, and capable of executing oscillations about a vertical axis. In the absence of aerodynamic unbalance, the force on the screen is steady and the intensity of the screen vibration recorded electrically is then a measure of the unbalance. This is compensated by adjustment of the blade setting, after which the normal dynamic balance is carried out. It is stated that the apparatus responds to differences in setting angle as small as .1°. It is interesting to note that the aerodynamic unbalance couple due to difference of .5° in the setting of one of the blades of a normal three-bladed airscrew (3.5 in. diam. 1,700 r.p.m., 900 h.p., 350 Km/p) produces about the same effect as displacement of the C.G. of the complete propeller by .25 mm. (blade weight 33 kg.).

The effect of unbalance of the airscrew on the structure of the aircraft depends on the nature of the unbalance. According to the American reference already quoted, inertia unbalance, especially those of the static type, induce lateral vibrations, whilst aerodynamic unbalance causes longitudinal vibrations of the aircraft structure.

This has led to the development by the Hamilton Standard Propeller Company of a special vibration recorder for investigating the resonance of certain parts of the aircraft structure both on the ground and in flight. From this changes in airscrew characteristics can be deduced (wear of bearings, erosion of blades, change in blade setting, etc.), and at the same time the static structure of the aircraft checked as a whole.

In carrying out such tests on the ground, care must be taken to place the aircraft against the wind, otherwise errors due to cross wind forces are likely to arise.

The Coupling of Airscrew Blades in Variable Pitch Mechanisms. (W. Nitzsche, Luftwissen, Vol. 10, No. 3, March, 1943, pp. 74-77.) (111/20 Germany.)

Any coupling mechanism must ensure equal and opposite rotation of the blades. The change in setting must be accurate within close limits, operate smoothly and if possible be self-locking.

In order to produce rotation, a couple M must be applied to the blade root and depending on whether this couple is produced by a control force P or a control couple, the author differentiates between PM or MM gears. In each case, either, a mechanical linkage or a gear drive may be employed. The mechanical linkage again can be sub-divided into true links, flexible links (belts or chains) or hydraulic linkage. Similarly the gear drive may be of the single pin, cam, screw, pack, worm or spur wheel type.

The author illustrates typical examples of each type of drive.

Mechanical linkage has been found unsatisfactory. They are not self-locking and subject to alternating load (fatigue!). All blade vibrations have to be supported by the mechanism and the bearings of the links or ball cups have to be made large to prevent rapid destruction.

Flexible links (belts) are not sufficiently accurate as regards phasing, whilst chains are likely to break under fatigue.

Hydraulic operation of the coupling mechanism must be ruled out since it is impossible to maintain a given blade setting (leakage, temperature effects hunting). The provision of a separate hydraulic system for this purpose is also objectionable.

This only leaves the gear drives as possible solutions. Pin and slide drives are simple but suffer from the defect that the area of contact is very small, leading to high bearing pressures. Nevertheless several designs based on this principle have been successful in practice. Spur or worm gears have the advantage that a high gear ratio can be obtained which reduces wear and decreases weight. The spur gear with a central crown wheel is very simple and accurate, but unfortunately not self-locking. This leaves the eccentric worm gear of the *MM* or control moment type as the only practical solution.

The Development of Electrical Equipment in Aircraft. (E. Ruhlemann, Luftwissen, Vol. 10, No. 3, March, 1943, pp. 83-85.) (111/21 Germany.)

A statistical analysis of the electrical equipment covering both circuits and apparatus is presented for a typical Dornier twin-engined aircraft for the years 1936, 1938 and 1940 respectively.

The graphs give the following information under six principal groups:—

(1) No. of separate circuits required for certain purposes, such as power generation, lighting, instruments, etc.
(2) Length of circuits as a function of cross-section of core.
(3) Weight of circuits including insulation as a function of cross-section of core.
(4) Number of separate items of equipment classified according to nature, such as power generator, lighting, instruments, control gear, etc.
(5) Power consumption of individual equipment items.
(6) Weight of individual equipment items.

In each case, the totals for any of the above groups is put equal to 100 for the 1936 model. The values for 1938 and 1940 are given in the following table:—

	Year.		
	1936	1938	1940
No individual circuits	100	147	295
Length of circuits	100	122	235
Weight of circuits (incl. insulation) ...	100	100	187
No. of ind. equipment items	100	140	275
Power consumption	100	122	200
Weight of equipment	100	112	154

Thus whilst the number of equipment items has increased 2.75 times and the power consumed has been doubled over the period 1936-1940, the weight of the circuits has only increased 1.87 times and that of the equipment 1.54 times.

Evidently the individual circuits have been shortened and the average weight and power consumption for equipment items reduced.

From detailed examination of the various items making up the six principal groups, it appears that the following factors have undergone the greatest change over the period under consideration.

(1) Six-fold increase in the number of circuits for military purposes.
(2 Eight-fold increase in the number of military equipment items.
(3) Four-fold increase in the length of .75mm.^{2} wiring.
(4) Two-fold increase in power consumption of electric motors.

The author is of the opinion that a change over from the present D.C. to three phase alternating current is less attractive than it appeared in 1936.

French Views on Power Plant Problems. (C. Waseige, Int. Av., 822, 16/6/42, pp. 17-18.) (111/24 France.)

Owing to the naturally limited output per cylinder, an increase in the number of cylinders to up to 42 cannot be avoided in the design of *high-performance engines;* the output of such engines is expected to attain (probably too conservatively) about 60 h.p. per cylinder, or a total of 2,500 h.p. This power will necessitate a very large airscrew diameter which, with a view to limiting the blade tip speeds, would indicate the use of co-axial, oppositely rotating airscrews. Higher engine outputs will require the *coupling of two engines* jointly driving a pair of oppositely rotating airscrews; when the engines are arranged in tandem, it would seem useful that each of the engines should drive one of the two airscrews, while in the case of engines mounted side-by-side (in a Vee, seen in plan form) their output is better transmitted by a common gear and distributed among the two airscrews; in the event of engine failure, the engine involved is to be disengaged from the transmission gear. For the braking of the aeroplane after the landing an *extremely rapid change of the airscrew pitch* to a negative angle is desirable; two gear ratios must therefore be provided in the pitch changing mechanism of the airscrew. As regarding *engine supercharging,* the lecturer recommends the adoption of a two-stage multi-speed supercharger; the prospects of the exhaust turbine-driven superchargers are limited due to the impairment of the cylinder charge as a result of the back pressure of the exhaust gases; besides the supercharging the sucking off of the exhaust gases by means of blower should be considered. The lecturer does not consider the *direct fuel injection* into the combustion chamber as a decisive advantage but demands the transfer of the carburettor to the compression side of the supercharger. Finally, some problems of engine cooling were alluded to, and preference is given to water cooling under increased pressure to the employment of coolant liquids boiling at higher temperatures.

Correlation of Laboratory Oil Bench Tests with Full-Scale Engine Tests. (C. W. Georgi, J.S.A.E., Vol. 51, No. 2, Feb. 10th, 1943, pp. 52-62.) (111/25 U.S.A.)

Twenty laboratories, co-operating in the Bench Test Sub-committee's programme, ran tests on six reference oils in Underwood apparatus, Lauson single-cylinder engines, and in a number of other types of laboratory oil test devices. The six reference oils had an extensive test background in full-scale engines.

Agreement among laboratories testing the same oils in the same type of apparatus was surprisingly good considering that standardized test conditions were not used and that the test procedures used by the co-operating laboratories varied considerably. Correlation of the laboratory tests with full-scale engine tests was also very good in the majority of instances.

The test data compiled from the co-operative work emphasize the importance of oxidation catalysts and test temperatures on oil deterioration and the degree of correlation between laboratory bench tests and full-scale engine tests. The co-operative test data also indicate suitable test conditions in the various types of bench apparatus which tend to produce the most consistent results indicative of full-scale engine performance as well as indicating inadequate or extreme test conditions which may tend to give misleading results.

Measures for Ensuring Reliability of Aircraft Engines. (H. Kouba, Luftwissen, Vol. 10, No. 2, Feb., 1943, pp. 38-42.) (111/26 Germany.)

Over the past few years, the specific output (h.p./litre) of aircraft engines has increased by over 40 per cent. whilst the specific weight (kg./h.p.) has

decreased by over 16 per cent. As a result of this development, it is obvious that the engine structure must have undergone a severe increase in thermal and dynamic loading and that special measures for ensuring reliability are required.

The author classifies these measures under the heading of design, testing and maintenance.

Reliability may be impaired by faulty handling quite as much as by continuous loading and for this reason the author puts foremost the design of a control system which is as simple and foolproof as possible. Whilst early aircraft engines could be operated satisfactorily by throttle control only, optimum performance of a modern power plant requires the simultaneous adjustment of a larger number of factors such as mixture strength, engine and supercharger r.p.m., boost pressure, ignition timing and propellor blade setting. Since the pilot is normally already fully occupied in flying the machine, the optimum setting of the various controls can hardly be expected and mistakes are bound to occur. The automatic control system as now standardized in the German Air Force prevents serious mistakes and limits the pilot's duties to a single manual control. In the author's opinion, this design feature alone has had most beneficial effects on engine reliability. Amongst other details referred to the necessity of providing localised "weak spots" in the transmission drive to certain auxiliaries is stressed. Should the auxiliary seize up, the transmission will shear at the required point and serious damage will be avoided.

Important auxiliaries, such as magnetos and fuel pumps, are fitted in duplicate. A considerable saving in weight has resulted from the design of special twin units housed in a common casing and driven by a single shaft.

After pointing out that weaknesses in design are only shown up after lengthy practical experience (indifferent handling) the author discusses changes in operative conditions which may enable the engine to function till the parts have been redesigned. This piston trouble can be alleviated by increase in mixture strength or retarding of ignition, insufficient oil supply at low speed remedied by speeding up the minimum idling r.p.m., torsional troubles overcome by keeping clear of resonance speeds, etc.

Details of development tests both on the ground and in the air are given. These culminate in the official type test, during which the new design must carry out power runs of 100-200 hrs. and show no signs of deterioration after dismantling.

In spite of all precautions during manufacture and inspection, it is not safe to count on the type test period as being necessarily trouble-free during actual flying operation of the engine. This is partly due to faulty operation by the pilot (in this connection the benefits of an automatic control have already been mentioned), accentuated by the peculiarities of the engine installation in the aircraft. Faulty inspection prior to final assembly may also play a part. To ensure reliability, it is essential that incipient sources of trouble be recognized and eliminated at an early stage. For this purpose the engine must receive maintenance and periodic overhauls. The engine must be run up to power before every start and any abnormal behaviour during flight noted in the log. Each day, the exterior of the engine must be inspected, especially as regards leakage of fuel and oil pipes and security of locking devices. Major inspections are carried out after 25, 50 or 100 flight hours, depending on engine type. These involve tests of compression, play in valve gear, adjustment of magneto and plugs, cleaning of filters, change of oil and coolant.

Minor and major overhauls follow these inspections at intervals, depending on engines type and employment. Minor overhauls involving only the partial dismantling of the engines are carried out after 50-300 flight hours. (Inspection of piston and valves.)

Complete dismantling of the engine is carried out after 200-1,200 flight hours (bearings and transmission gear). The period which can elapse between major overhauls is evidently a measure of engine development. In this connection it

must, however, not be forgotten that the field of utilization plays an important part. Thus an engine mounted in a fighter aircraft necessitating frequent starts at maximum power has a shorter overhaul period than the same engine operating over long distances at cruising speed.

Measurement of Piston Temperatures Under Load. (W. Glaser, Luftwissen, Vol. 10, No. 2, Feb., 1943, pp. 44-49.) (111/27 Germany.)

It is now generally recognised that tests on the performance of lubricating oils are only of value if they are carried out in an engine operating under load conditions resembling those occurring in practice. Moreover these conditions must be maintained constant over relatively long periods. One of the most important factors requiring control is that of the piston temperature, especially that of the ring grooves. It has been customary up to now to rely on cylinder wall temperatures only, it being assumed that steady wall temperatures imply also a constancy of the ring groove temperature. The piston temperature does, however, not only depend on the wall temperature but also on the amount of cooling by oil splash and on the clearance. This accounts for the fact that oil tests carried out on identical engines and under the same external load conditions may yield very different results and will have to be repeated a large number of times before useful results can be deduced. It is obvious that if the piston temperatures could be measured directly in such tests, greater consistency would result. The most promising method for this purpose appears to be to fit a thermocouple inside the piston, the lead out being by means of contact springs operated by lugs attached to the piston skirt. Contact is made towards the bottom of the stroke for about 70° crank angle and by using a null method, variations in contact resistance are eliminated. Four references to American work are given by the author, the latest being *S.A.E. Journal*, March, 1941.

The method has been developed by the DVL and details of the installation of the thermocouple and design of contact springs are given.

Instead of estimating the couple temperature from the balancing EMF supplied by a Wheatstone bridge, as was done in the U.S.A., a second couple working in opposition to the piston couple is introduced into the circuit. This couple is heated electrically till the balance point is reached, the temperature being read directly on a millivoltmeter connected to a third couple attached to the surface of the second.

The method has been successfully employed on two small test engines of 300 and 500 c.c. swept volume respectively, operating at piston speed of the order of 8m./sec. Further improvements (mainly connected with the installation of the wires inside the piston) enabled satisfactory results to be obtained also on a full scale BMW 132 cylinder (piston speed up to 14 m./sec., ring groove temperature of the order of 330°C.).

Power runs up to 80 hrs. duration have been carried out without trouble and it is stated that temperature changes of the order of $\frac{1}{2}$°C. are easily recorded.

No details of any oil tests are given.

Aircraft Diesel Engines. (Luftwissen, Vol. 10, No. 3, March, 1943, pp. 77-79.) (111/28 Germany.)

The history of the Junkers aircraft Diesel engine may be said to date from the basic Junkers patent (No. 220124) of the year 1907, covering opposed piston operation in general.

The first light-weight experimental type (Model MO.3) was tested in 1914 and developed 180 h.p. at a specific weight of 1.4 kg./h.p.

The MO.3 was followed by FO.2 in 1916, which developed 500 h.p. and was used for experiments covering both oil and petrol injection.

This as well as model FO.3 of 1926 employed five cylinders which was not ideal from the point of view of balance. A smaller 6-cylinder model, FO.4, was

therefore developed which passed its type test in 1931, developing 720 h.p. for an engine weight of 800 kg. This model, now known as the Jumo 4, was used by the German Lufthausa in the Junkers G.38 and similar large aircraft, giving entire satisfaction. By 1935, the power output had been increased to 750 h.p. and the specific weight reduced to 1 kg./h.p.

The design of a smaller, high speed unit, the Ju 205 was started in 1932, and the type test in the following year gave a power output of 550 h.p. at a weight of 500 kg. Specific weights below 1 kg./h.p. were thus reached for the first time for a Diesel engine. The same type has now been developed to give over 700 h.p. and has carried out numerous long distance flights on the Ju 86, Do 18, Do 26 and BV 139 aircraft.

Prof. Junkers always regarded the aircraft Diesel as only the first stage in the development of the power plant of the future.

A modification of the opposed piston engine yielding the so-called " free piston " compressor was actively studied in connection with researches on gas turbines.

It was hoped that this would ultimately lead to a practical solution of the jet propulsion problem.

Natural Frequencies of Torsional Systems, including Elastically Mounted Epicyclic Gearing. (W. Benz, L.F.F., Vol. 20, No. 2, 27/2/43, pp. 46-47.) (111/29 Germany.)

The epicyclic gearing has the following characteristics:—

θ_a = moment of inertia of outer casing (internal gear connected to high speed shaft).
θ_t = ditto for planet wheel carrier.
θ_s = ditto for sun wheel.
θ_p = ditto for planet wheel.
m_p = mass of planet wheel.
C_s = stiffness of sun wheel shaft (stationary).
R_a = pitch circle of outer casing gear.
R_i = ditto for sun wheel.
R_p = ditto for planet wheel.

The author shows that this gear is the equivalent of an ordinary spur wheel reduction gear of ratio $R_a/(R_a+R_i)$ connecting two masses θ_1 and θ_2 of which the moments of inertia are respectively:—

$$\theta_1 = \theta_s + \frac{\theta_p}{2}\left(\frac{R_a}{R_p}\right)^2$$

$$\theta_2 = \theta_t + \left(m_p - \frac{\theta_p}{R_p{}^2}\right)\left\{\frac{(R_a+R_i)}{2}\right\}^2$$

θ_1 is attached to the high speed shaft and takes the place of the gear casing.

The shaft stiffness between θ_1 and θ_2 depends on the frequency α of the vibrations and is given by

$$(C_s - \theta_i\alpha^2)\left(\frac{R_a{}^2}{R_i{}^2}\right)$$

where $\theta_i = \theta_s + \frac{\theta_p}{2}\left(\frac{R_i}{R_p}\right)^2$

This geared system is then reduced to the equivalent line system by multiplying θ_2 by $\{R_a/(R_a+R_i)\}^2$ and decreasing the stiffness of the low speed shaft between θ_2 and the first right hand mass in like proportion.

Production Applications of Flash Welding. (R. Milmoe, J.S.A.E., Vol. 51, No. 2, Feb., 1943, p. 73.) (111/30 U.S.A.)

Flash welding is a type of butt weld in which the two parts to be joined are connected to the secondary terminals of a low-voltage high-current transformer, are then brought into close proximity, and the voltage applied. This results in

a flashing between the surfaces heating them to the melting point. The flashing is continued for a predetermined period, the parts being moved together as the material burns away. At the end of the flashing period, the parts are forced together rapidly and the current is turned off, giving a welded structure of a forged nature.

While extensively used by the automobile industry, this process has not found its way into aircraft construction in the past, because the problems here are somewhat different, and in many cases more exacting.

The advantages of the flash welded joint over the fusion welded joint include better physical characteristics (100 per cent. joint strength), lower weights, cheaper and faster production, no warping as a result of welding and less operative skill required. SAE 4130 tubing joints welded in the normalized condition with no further heat treatment, exhibit physical characteristics equal to those of the parent material, when tested in static tension.

Most applications have been on tubular and solid round parts, although the process has been used on other types of sections. Parts include the common end-fitting to tube joint, in which the fitting may be a forging or may be machined from bar stock or another piece of tube.

The major points to be considered, in designing aircraft parts for flash welding, are:—

1. Mating surfaces of parts must be of the same shape and approximately the same cross-sectional area.
2. This cross-sectional area must be constant for a sufficient distance back from the joining surfaces to allow all burn-off to take place in such constant-area section.
3. Best design is for the welding faces to be normal to the centre line of the parts, so that the line of travel is parallel to this centre line.

While it is preferable to design new parts especially for the flash welding process, the author pointed out that it has been found feasible to convert parts which are being arc or gas welded.

Glass Gauges. (F. J. Oliver, The Iron Age, 4/2/43, pp. 35-39, 98.) (111/31 U.S.A.)

Gauges made of glass have been successfully employed by the American Ordnance Department. It is predicted that eventually over 50 per cent. of all fixed steel gauges used in ordnance work will be replaced by glass gauges, for which the following advantages are claimed:—

1. Small thermal conductivity and hence smaller change in dimensions due to handling.
2. Encourage careful handling of gauge by relatively untrained inspectors.
3. Fragility is an advantage. If dropped, the gauge is either smashed or survives unchanged. Steel gauges may become deformed when dropped and thus pass defective work.
4. Less tendency to bind in close fits.
5. Scratches on the glass do not raise any burrs and effective size of gauge is not altered.
6. Glass does not corrode.
7. The abrasive resistance of the glass gauge is at least as great as that of steel.
8. Glass gauges are much less expensive and require less operator and machine hours to produce than steel gauges.
9. Tool steel is saved for other purposes.
10. Smaller weight of glass gauges makes it easier to handle.
11. Transparency is an advantage in many gauging operations.
12. Greasing and degreasing operations are eliminated (storage, checking and stripping).

A number of representative ordnance gauges made of glass are described and illustrated (plug, ring, snap, profile and position gauges).

Chamber gauges for measuring up the entire profile of a complex shape (artillery cartridge case) are in process of development.

Some notes on the moulding of the glass and the grinding process adopted are given.

For lapping or polishing to close limits, range is excellent. By proper selection of wheels and speeds an excellent surface finish can, however, be obtained by grinding alone. Sparking must be avoided, as this is apt to cause microscopic cracks and thus weaken the glass.

Nomogram for Determining the Number of Separate Drawing Operations Required to Produce a Given Ratio of Diameters. (G. Soph and W. Frey, Luftwissen, Vol. 10, No. 2, Feb., 1943, p. 243.) (111/32 Germany.)

If

d = diameter of finished product.
D = diameter of initial product.
n = number of separate draws.

$$\frac{d}{D} = m_a \cdot m_w^{n-1}$$

where m_a = proportional reduction in diameter permissible in first draw.
m_w = ditto for subsequent draws.

From the above

$$n = \frac{\log\left(\frac{d}{D} \Big/ m_a\right)}{\log m_w} + 1.$$

The nomogram has double logarithmic scales and gives the value of n, provided m_a and m_w are known for the material in question.

It is obvious that if $d/D > w_a$, a single drawing operation will give the required result, m_w is usually 10 to 20 per cent. $> m_a$.

Stress Increases in Hollow Thin-Walled Sections Under Torsion. (A. Weigand, Luftwissen, Vol. 10, No. 2, Feb., 1943, pp. 49/50.) (111/33 Germany.)

The sections considered are of approximately elliptical shape such as occur in hollow propeller blades.

If

M = torsion moment applied;
I = torsional rigidity;
l = length of mean line of cross-section of material;
F = area enclosed by mean line;
τ_n = nominal stress;

we have $\tau_n = \frac{M}{I} \times \frac{2F}{l}$

This nominal stress takes no account of the stress concentration at the inner corner. Assuming that the stress function only depends on the radius of curvature of the rounded corner, we may put

$$\frac{d\tau}{d\rho} + \frac{\tau}{\rho} = 2^{\bullet}\frac{M}{I}$$

$$i.e.,\ \tau = \frac{M}{I}\rho\frac{c}{\rho}$$

Since the shear flux must be the same in the flat and corner sections,

$$\int_{\rho 2}^{\rho 1} \tau d\rho = \tau_n \cdot t$$

where

ρ_1 = radius of curvature of inner corner.
ρ_2 = ditto of outer corner.

This enables c to be eliminated. Defining $\tau_{max}/\tau_n = \alpha$ = stress concentration coefficient the author finally obtains

$$\alpha = \frac{A}{\log (1+A)} - B\left\{\frac{(1+A/2)}{\log (1+A)} - \frac{A}{1}\right\}$$

where

$$A = \frac{t}{\rho_1}$$

$$B = \frac{lt}{2F} \quad (t = \text{wall thickness})$$

For

$l = 43$ cm.
$F = 48.6$ cm.^{2}.
$t = .4$ cm.
$\rho_1 = .1$ cm.
$\alpha = 2.20$.

The Distribution of Strains in the Rolling Process. (C. W. MacGreggor and L. F. Coffin, J. App. Mech., Vol. 10, No. 1, March, 1943, pp. 13-20.) (111/34 U.S.A.)

A series of experiments are described in which the complete strain distributions are given for copper bars rolled with a varying number of passes in different directions at a reduction of 20 per cent. per pass.

The following conclusions may be drawn from these experiments:—

1. A comparison of the lateral-compression tests and the rolling experiments on bars coated with a brittle lacquer demonstrated the presence of similarly directed elastic tensile strains in both cases for some distance from the centre lines of the rolls.
2. The network tests showed that the shearing strains were always the greatest in the outside fibres of the bars when they were rolled in the same direction with a number of reductions. In contrast to this, the shearing strains were greatest inside the bar when rolling took place in alternately opposed directions.
3. The method of superposition, described in the paper, may be used to obtain the shape of the vertical profile lines of the bar for various sequences of rolling provided the profiles are known for the same per cent. reductions, each of which is produced by rolling in the same direction.
4. The sequence of the rolling operation does not affect appreciably the magnitudes of the axial, vertical, or lateral normal strains.
5. The sequence of rolling affects in a very marked manner the shearing strains and the shape of the profiles of the vertical lines scribed on the bar. The alternately opposed directions of rolling produce a much less distorted network with very much smaller shearing strains than does the rolling of the bar in one direction only during the various passes.

Oscillations of Suspension Bridges. (H. Reissner, J. App. Mech., Vol. 10, No. 1, March, 1943, pp. 21-22.) (111/35 U.S.A.)

The author has developed a theory of oscillations of stiffened cable systems which is applicable to the design of suspension bridges. Dealing with free oscillations in the first part of the paper the author established a system of linear differential equations with variable coefficients taking into account the horizontal

displacements and inertia forces, the change of thrust along the cable, the slope of the cable, and the torsional stiffness of the girder. An approximate integration by the Rayleigh energy method is shown and is numerically exemplified for the lowest antisymmetric mode.

The second part of the paper treating self-excited oscillations has been prepared under the influence of observations, experiments, and conclusions reached in connection with an (official) report on the Tacoma bridge failure. This report demonstrated that the aerodynamic and structural damping—the first acting through the width of the roadway, the second by the internal friction—plays an important part in the safety of a suspension bridge. It showed further that the dangerous oscillations are of somewhat higher frequency than the free oscillations with logarithmic decrement a linear function of the reduced velocity so that not elastic instability under wind forces nor resonance from wind gusts but the bridge as a self-exciting mechanism absorbing energy out of a steady wind flow had to be assumed as the cause of the failure.

This experimental linear decrement law is utilized by the author to derive in conjunction with the dynamic equations formulas intended to serve as the basis for the dynamic requirements for suspension bridges.

Possibility of Reducing the Electrical Contact Resistance of Aluminium and Aluminium Alloys. (C. Wagner and V. Stein, L.F.F., Vol. 20, No. 2, 27/2/43, pp. 33-41.) (111/36 Germany.)

As is well known, aluminium on exposure to the atmosphere is rapidly covered by a thin layer of oxide which has an appreciable electrical resistance. This is apt to give trouble at the terminals and although much can be done by the careful mechanical design of the latter, a reduction of contact resistance would further the more general employment of aluminium in electrical systems and thus serve to conserve copper.

The authors review the various methods available for this purpose, such as:—

1. Copper cladding.
2. Electro-plating.
3. Dipping into molten tin or cadmium.
4. Treatment with $Cu_2 Cl_2$ vapour.
5. Replacement of $Al_2 O_3$ by zinc oxide aluminate.

Of the above (1) has the disadvantage of requiring appreciable quantities of Cu, whilst (2) is very uncertain in its action. The dipping process (3) making use of the special metallisation alloy L III developed by Siemens was found very satisfactory. This alloy has the following composition:—

35 per cent. Sn, 35 per cent. Cd, 28 per cent. Zn, 2 per cent. Pb.

Application to finely stranded cables is, however, difficult and the method has the further disadvantage that both Sn and Cd are in short supply. Copper or chrome diffusion by treatment by halogen vapours (4) is of considerable theoretical interest and the process was examined in great detail by its authors. Whilst this process has been very successful in the case of steel, the relatively low melting point of aluminium restricts the maximum working temperature to about 600°C. Under these conditions the vapour pressure of $Cr_2 Cl_6$ is only of the order of 10^{-3} atmospheres, and the large quantities of gas required render the process uneconomical. Although the vapour pressure of the copper halogen is considerably higher, the deposits were found to be so uneven that the process is of no practical value. Attempts were finally made to obtain layers of Zn O on the surface of the aluminium. As is well known, such layers have a relatively small electrical resistance and attempts were made to produce a stable deposit by saturating CO_2 with $Zn Cl_2$ at 500°C. and passing the mixture over aluminium kept at about the same temperature. The results obtained varied, but no marked improvement in contact resistance was obtained.

It is thus concluded that the dipping process with Sn-Cd alloy presents the only satisfactory treatment.

The Drawing of Tough Materials Through Convergent Conical Dies. (T. Poschl, Ing. Archiv., Vol. 13, No. 6, 1943, pp. 342-354.) (111/37 Germany.)

In a previous paper the author has investigated the drawing process on the assumption of a purely elastic material. It was concluded that no agreement of the calculated with the observed extension of the material could be achieved as long as the usual elasticity coefficient E was retained. In the present investigation the author introduces the yield point as the most important criterion. Above this point the material is no longer elastic and the resultant changes in shape proceed at a greatly increased rate. The stress-extension equations employed by the author are linear and set off at the yield point (σ_s, $\epsilon=0$) instead of passing through the origin. The inclination β of the stress/extension line is an indication of the strain-hardening of the material when undergoing large changes in shape, *i.e.*, tan β is the strain-hardening coefficient V. We then have $\sigma=\sigma_s+V\epsilon$. For steel, V is of the order 1,000 kg./cm.^{2} and $\sigma_s/V \simeq 3$. With the help of this modification to the classical elastic theory the author is able to obtain expressions for the stress-distribution in the material while passing through the die, and calculate the corresponding large extensions.

The method is illustrated by means of a worked-out example. Of interest is the rapid increase in the radial stress and extension of the material as it flows through the exit of the die. The compressive stresses, on the other hand, maintain their relatively high value practically unchanged over the length of the die.

The Bending Deflection of a Circular Plate Under Eccentric Loads. (W. Muller, Ing. Arch., Vol. 13, No. 6, 1943, pp. 355-376.) (111/38 Germany.)

After a preliminary discussion on the geometry of bipolar co-ordinates employed, the author considers the following load cases.

1. Single force.
2. Number of single forces arranged symmetrically on a concentric circle.
3. Uniform loading along a concentric circle.
4. Loading along an eccentric circle.

Mathematical expressions for the deflection stress, bending and torsional moments are given and diagrams show the lines of constant deflection in each case.

The method can be extended to cover the case of a load application along a straight line.

Theory of the Closed Circular Spring. (R. Sonntag, Ing. Archiv., Vol. 13, No. 6, 1943, pp. 380-397.) (111/39 Germany.)

A thin circular ring or thin walled cylinder can undergo elastic deformations of considerable extent when loaded along a diameter, i.e. compressed between parallel plates or pulled like a chain link.

The author applies the non-linear elastic theory to the case when the ring is formed from an originally plain strip by the application of two end moments, i.e. the ring in its undiformed state has already an inherent stress with constant bending moment. The accurate solution involves the integration of the non-linear Eulerian differential equation of the second order for the elastic line of an originally straight rod and leads in general to elliptic functions.

The author shows that the spring characteristic (i.e. load/deflection curves) are not in general affected by the presence of the inherent stress system associated with a constant bending moment and that therefore the law of superposition can also be applied in the case of large deformations.

The subject appears to be of practical interest for the design of bending springs containing both large load capacity and considerable deformations.

Vultee Flight Test Recorder. (Aviation, Vol. 42, No. 1, Jan., 1943, p. 163.) (111/43 U.S.A.)

Flight testing necessarily implies the simultaneous reading of a large number of instruments and for this purpose photographic recording is usually employed. This has the disadvantage that the results can only be evaluated after development of the film when the aircraft has returned to its base. The Vultee Aircraft Co. have developed a light-weight wireless transmitter which can send out up to 70 code signals every three-quarters of a minute corresponding to the readings of the same number of instruments fitted to the plane. These readings are recorded by a ground receiver on a sound film and finally decoded into the form of graphs.

The test results can then be worked out whilst the aircraft is still flying and the pilot can be informed by radio of the progress of the work. Manœuvres can thus be extended or curtailed as required and even in the case of an accident or forced landing valuable data cannot be destroyed. The range of the instrument is several hundred miles and the transmitter is stated to be small enough for installation in a single-seater fighter or trainer.

Angular Measurements in Ballistics. (K. Gey, Introduction to Ballistics, 1937, pp. 64-65.) (111/46 Germany.)

In Germany and most other continental countries, the angular deflection of a gun is expressed in "strokes" (German = Striche), 1,600 strokes making a right angle = 90 mathematical degrees.

Sixteen strokes correspond to a so-called "New degree" (German Neugrad), 100 new degrees are equal to a right angle.

The strokes are indicated by the following sign ~

To convert strokes into mathematical degrees divide by 1,000 and multiply by 56.25 (1 stroke = 3.4 minutes)

(1° = 17.78 strokes).

Very occasionally, the ballistic angles are also expressed in so-called "sixteenth degrees" (German = sechszehnte Grad), 1,440 of which make a right angle.

In this case the complete circle corresponds to 5,760 "sixteenth degrees."

To convert sixteenth degrees into mathematical degrees, divide by 1,000 and multiply by 62.5.

Since the number of strokes or "sixteenth degrees" divided by 1,000 gives approximately the number of radians in the corresponding angle, the same number also expresses very nearly the chord in metres at a distance of 1,000 m.

Thus a lateral displacement of 45 m. at 1,500 m. distance corresponds to

$$45 \times \frac{1{,}000}{1{,}500} = 30 \text{ strokes.}$$

Similarly 50 strokes correspond to a displacement of 100 m. at 2,000 m. distance.

This simple conversion of angles into distances and vice versa is the reason for the adoption of this method of angular measurement in ballistics.

Notes on a Controlled Type of One Dimensional Motion (Solution of Second Order Non-Linear Differential Equation). (H. Bilharz, Z.A.M.M., Vol. 22, No. 4, August, 1942, pp. 206-215.) (111/47 Germany.)

The author considers the integrals of the following non-linear equation:—

$$\ddot{x} + 2a\dot{x} + bx + c\,sgn\,(x + \rho\dot{x}) = 0$$

where $x(t, \rho)$ is a real function of the independent variable $t \geqq 0$ and of the real parameter ρ, where $-\infty < \rho < \infty$, $a > 0$, $b > 0$, $c > 0$ are constants.

$$sgn\,(x + \rho\dot{x}) = \begin{cases} +1 \\ -1 \end{cases} \text{for } x + \rho\dot{x} \begin{cases} > 0 \\ < 0 \end{cases}$$

and determines the sign of the constant c.

It is assumed that $x(t, \rho)$ can be differentiated twice in sections without giving rise to discontinuities. The equation thus represents the straight line motion of unit mass in a generalised field of force and includes the case of combined velocity damping and constant friction. By applying the Trefftz stability criterion the author demonstrates that all periodic solutions of the general equation are stable and that all other stable solutions converge towards this periodic motion for $t \Rightarrow \infty$. The investigations are more particularly concerned with the application of automatic control for the stabilisation of dynamic systems with one degree of freedom.

The simpler case with $b=0$ has already been considered by the author in a previous paper (R.T.P. Translation No. 1,391, " Rolling stability of an aircraft with freedom about its longitudinal axis and automatically controlled intermittent and constant aileron moments.")

It is interesting to note that in this case a lag of its control system may be beneficial.

Determination of Most Favourable Interval for the Numerical Integration of Systems of Differential Equations. (L. Collatz, Z.A.M.M., Vol. 22, No. 4, August, 1942, pp. 216-225.) (111/48 Germany.)

The numerical integration of ordinary differential equations of the first and second order by the Adams and Stormer methods is receiving increased attention, especially as regards interpolation processes. Such processes are of considerably greater accuracy than if extrapolation is adopted, whilst the work of calculation is not increased to any considerable extent. Unfortunately the interpolation process is very sensitive to the step interval employed, there being an optimum step " h " for each equation or system of equations. If a smaller step, say $h/2$ is employed, the labour involved is doubled. For a step $2h$, the iteration converges too slowly, and the trials may have to be carried out three or even four times before the numerical results become steady.

The author shows how the natural or optimum step h can be determined in any special case and thus the amount of labour estimated.

It should be emphasised that this step refers to current calculations only. For the initial start, steps of the order $h/2$ or $h/3$ must be employed to obtain the necessary degree of convergence.

The natural step h defined by the author is useful as a guide for the step selection in the Runge-Kutta process.

Evaluation of Time Records by the Simultaneous Employment of Instruments of Different Types. (H. Knobloch, L.F.F., Vol. 20, No. 2, 27/2/43, pp. 42-45.) (111/49 Germany.)

Up to a point, the accuracy of a time-space record can be improved by increasing the number of measuring points and adopting a suitable method for drawing the mean curve.

The author points out that a further increase in accuracy is possible if in addition to the time/space record, information of the change in velocity and acceleration with time is available. This will necessitate the employment of two additional instruments, working independently of each other but correlated on a time basis.

Thus at certain instants t_i, t_k and t_l the following measuring values will be available :—

$S_i = S(t_i)$ = path or distance moved.
$V_k = V(t_k)$ = velocity.
$C_l = C(t_l)$ = acceleration.

The evaluation for the path s is then carried out by the compensation function

$$x(t) = a_o\phi_o(t) + a_1\phi_1(t) + \text{etc.} + a_n\phi_n(t) = S(t)$$

where $\phi(t)$ are suitable known functions but the coefficients "a" still indeterminate.

These coefficients are determined by the method of least squares, *i.e.*,

$$p\sum_{i}\left[x(t_i)-S_i\right]^2+q\sum_{k}\left[\frac{dx}{dt}(t_k)-V_k\right]^2+r\sum_{l}\left[\frac{d^2x}{dt^2}(t_l)-b_l\right]^2=\text{minimum.}$$

The three factors p, q, r are known and depend on the difference in the dimensions of the measured quantities. An allowance for the relative importance of the records of the different instruments can also be included.

By partial differentiation with regard to "a" and equating to zero, a system of $n+1$ equation is obtained from which the coefficient "a" can be determined.

A considerable simplification results if all the measuring points can be taken at the same time and repeated at constant intervals.

This is illustrated in the special case when only two instruments are employed, *e.g.*, a ground base installation for determining the path s of an aircraft flying horizontally and an accelerometer installed in the aircraft. Certain of the coefficients entering into the calculation are tabulated for ready reference, for a range of measuring points varying from 5 to 27. The case of the accelerometer suffering from a zero error receives special attention. This affects the position, but not the flight speed of the aircraft.

LIST OF SELECTED TRANSLATIONS.

No. 57.

NOTE.—Applications for the loan of copies of translations mentioned below should be addressed to the Secretary (R.T.P.3), Ministry of Aircraft Production, and not to the Royal Aeronautical Society. Copies will be loaned as far as availability of stocks permits. Suggestions concerning new translations will be considered in relation to general interest and facilities available.

Lists of selected translations have appeared in this publication since September, 1938.

TRANSLATION NUMBER AND AUTHOR.		TITLE AND REFERENCE.
		AERO AND HYDRODYNAMICS.
1744	——	*A Vortex Theorem for Steady Iso-Energetic Gas Flow.* (L.F.F., Vol. 19, No. 4, 6/5/42, pp. 145-147.)
1746	Linke, W.	*The Flow Resistance of a Heated Flat Plate.* (L.F.F., Vol. 19, No. 4, 6/5/42, pp. 157-160.)
1752	Reichardt	*Laws of Free Turbulence.* (V.D.I., Forshungsheft, No. 414, May-June, 1942, pp. 1-22.)
1753	Schlichting, A. ...	*The Boundary Layer of the Flat Plate Under Conditions of Suction and Air Injection.* (L.F.F., Vol. 19, No. 9, 20/10/42, pp. 293-301.)
		ENGINES AND ACCESSORIES.
1755	Schmidt, U. ...	*Influence of Type of Dust on the Performance of Air Filters.* (Z.V.D.I., Vol. 85, No. 39-40, 4/10/41, p. 800.)
1766	Dreyhaupt, F. ...	*The Present State of Research on Engine Knock.* (A.T.Z., Vol. 44, No. 21, 10/11/41, pp. 521-523.)
		AIRCRAFT, AIRSCREWS AND ACCESSORIES.
1762	Gramme', R. ...	*The Effects of Inertia in the Airscrew of the Aircraft in Curvilinear Flight.* (Schriften Akad. Luftfahrtforschung, No. 36.)

TRANSLATION NUMBER AND AUTHOR.		TITLE AND REFERENCE.
1763	Kalachev, G. ...	*A Contribution to the problem of Dynamic Longitudinal Stability of an Aeroplane.* (Trans. C.A.H.I., No. 235, 1935.)

MATERIAL AND ELASTICITY.

1745	——	*Circular Slide Rule for the Rapid Determination of the Correct Manometer Pressure on Hydraulic Presses Using Rubber Dies.* (Flugsport, Vol. 34, No. 16, 4/8/42, pp. 147-148.)
1748	Durer, A., and others	*Phosphatic Coatings as Aids in the Plastic Working (Cold Drawing) of Metals.* (Z.V.D.I., Vol. 86, No. 1-2, 10/1/42, pp. 15-18.)
1749	Hermans, P. ...	*Quantitative Methods for the Determination of the Degree of Orientation of Stretched Cellulose Fibres (Limits and Mutual Relationship).* (Koll. Zeit., Vol. 97, No. 2, Nov., 1941, pp. 223-231.)
1750	Hermans, P. H. ...	*Some Notes on the Structure and Swelling of Gels.* (Koll. Zeit., Vol. 97, No. 2, Nov., 1941, pp. 231-237.)
1754	Fredenhagen, K. ...	*Mathematical and Physical Importance of the Partial Molar Coefficients and the Deduction of the Duhem-Margules Law of Partial Pressures.* (Z. Electrochem., Vol. 48, No. 3, March, 1942, pp. 136-145.)
1761	Kraft, Alexeyer ...	*Esterification by Chlorocarboric Acid Esters.* (J. Ob. Chim., U.S.S.R., Vol. 2, No. 8, 1932, pp. 726-729.)
1764	Blumrich, S. ...	*Buckling Diagrams for Pine and Beech Struts.* (Flugsport, Vol. 34, No. 24, 25/11/42, Design Memoranda No. 3-4.)
1765	——	*Compacting Steel Swarf by Auto Combustion.* (Stahl und Eisen, Vol. 62, No. 44, 29/12/42, pp. 921-922.)

PHOTOGRAPHY.

1743	Berthold, R. ...	*The Fluorescent Screen Image and its Photographic Reproduction (X-Ray Examination of Materials).* (Luftwissen, Vol. 9, No. 6, 1942, pp. 184-189.)
1760	Wohlrab	*Development of Problems in Aerial Cameras.* (Luftwissen, Vol. 9, No. 2, Feb., 1942, pp. 37-44.)

MISCELLANEOUS.

1751	——	*French Regulations for Wireless Installations on Board Ship.* (Genie Civil, Vol. 99, No. 17, July, 1942, p. 213.)
1756	——	*Vienna Central Charging Station for Battery Vehicles.* (A.T.Z., Vol. 45, No. 9, 10/5/42, pp. 254-255.)
1757	Rosenstiel	*The Solution of the Physiological Problem of High Altitudes (the High Altitude Pressure Suit).* (Rev. Aeron. Internationale, Vol. 7, 1937, pp. 52-54.)

TITLES AND REFERENCES OF ARTICLES AND PAPERS SELECTED FROM PUBLICATIONS REVIEWED IN R.T.P.3.

Requests for further information or translations should be addressed to R.T.P.3, Ministry of Aircraft Production.

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Theory and Practice of Warfare.

Organisation and Training.

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1	8174	Germany ...	*German Directorate of Research.* (Inter. Avia., No. 847, 10/12/42, p. 13.)
2	8206	Germany ...	*Pre-Military Training at the N.S. Flying Corps (Photographs).* (Luftwelt, Vol. 10, No. 2, 15/1/43, pp. 36-37.)
3	8284	Germany ...	*Engineer Officer Career in the Luftwaffe.* (Flugsport, Vol. 35, No. 3, 3/2/43, p. 37.)
4	8318	G.B.	*R.A.F. in Russia.* (Inter. Avia., No. 846, 30/11/42, p. 21.)
5	8415	U.S.A. ...	*Aerial Strength.* (J. A. Ward, Aero Digest, Vol. 42, No. 1, Jan., 1943, pp. 84-86 and 126, 257-260.)
6	8440	U.S.A. ...	*Military Aircraft of the U.S. Army and Navy Air Forces are now Given Names.* (Aero Digest, Vol. 42, No. 1, Jan., 1943, p. 321.)
7	8512	U.S.A. ...	*Organisation of the U.S. Army Air Forces (A.A.F.) (Table and Explanation).* (Aviation, Vol. 41, No. 5, May, 1942, p. 183.)
8	8626	Germany ...	*Leaders of the Luftwaffe (XIX) (Adolf Galland).* (Aeroplane, Vol. 64, No. 1,651, 15/1/43, p. 72.)
9	8635	U.S.S.R. ...	*Patrol Planes at Sea.* (N. D. Ezhov, U.S. Air Services, Vol. 27, No. 8, Aug., 1942, pp. 28 and 46.)

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10	8661	G.B.	*Leaders of the Luftwaffe (XXV) (Seidmann).* (Aeroplane, Vol. 64, No. 1,657, 26/2/43, p. 241.)
11	8665	U.S.A. ...	*American Aeroplanes in Service—V (U.S. Army Air Forces).* (Aeroplane, Vol. 64, No. 1,657, 26/2/43, p. 258.)
12	8690	G.B.	*North African Air Commands.* (Aeroplane, Vol. 64, No. 1,661, 26/3/43, p. 349.)
13	8706	U.S.A.	*American Aeroplanes in Service—VIII (U.S. Army Air Forces).* (Aeroplane, Vol. 64, No. 1,661, 26/3/43, p. 372.)
14	8746	U.S.A. ...	*Efficiency Through Co-operation (Rotols School).* (Aeroplane, Vol. 64, No. 1,659, 12/3/43, pp. 299-300.)
15	8776	G.B.	*The Rotol and Dowty Schools of the R.A.F. Technical Command.* (Flight, Vol. 43, No. 1,784, 4/3/43, pp. 223-225.)
16	8785	Jugoslavia ...	*Jugoslav Air Force.* (Flight, Vol. 43, No. 1,784, 4/3/43, p. 229.)
17	8786	China ...	*China in the Air.* (Flight, Vol. 43, No. 1,784, 4/3/43, pp. 230-233.)
18	8802	G.B.	*British Airborne Division (Training).* (R. Montgomery, Aeronautics, Vol. 8, No. 1, Feb., 1943, pp. 48-49.)
19	8878	U.S.A. ...	*U.S.A. New Service Designations for Transport and Military Aircraft.* (Inter. Avia., No. 854-855, 3/2/43, pp. 11-12.)
			Design and Equipment of Military Aircraft.
20	8152	Germany ...	*Equipment of German Air Pilots for Overseas Flights.* (Der Adler, No. 2, 26/1/43, pp. 41-43.)
21	8177	U.S.A. ...	*Bell P-39 Instrument Board (Photograph).* (Inter. Avia., No. 847, 10/12/42, p. 1.)
22	8205	Germany ...	*First Junkers All-Metal Aircraft of* 1916-1918. (A. Klaprott, Luftwelt, Vol. 10, No. 2, 15/1/43, pp. 34-35.)
23	8260	U.S.A. ...	*Fleetway BT-12 Trainer (Design Details).* (C. H. Guishead, Aero Digest, Vol. 41, No. 6, Dec., 1942, pp. 186-187.)
24	8270	U.S.A. ...	*Comfortization of Military Aircraft (Part V).* (A. A. Arnhym, Aero Digest, Vol. 41, No. 6, Dec., 1942, pp. 196-208 and 283-287.)
25	8315	U.S.A. ...	*Sperry Hydraulic Belly Turret for Flying Fortress.* (Inter. Avia., No. 846, 30/11/43, pp. 12-13.)
26	8316	G.B.	*Whirlwind Flap Arrangements.* (Inter. Avia., No. 846, 30/11/42, pp. 1 and 14.)
27	8400	G.B.	*The Helicopter at War.* (Balfour, Engineer, Vol. 175, No. 4,549, 19/3/43, p. 232.)
28	8507	U.S.A. ...	*Charting Aircraft Stability.* (C. D. Perkins, Aviation, Vol. 41, No. 5, May, 1942, pp. 123-125 and 256.)
29	8509	U.S.A. ...	*Short Stirling Sectional Drawing.* (Aviation, Vol. 41, No. 5, May, 1942, p. 147.)
30	8514	U.S.A. ...	*Belly Tank on Airacobra (Photo).* (Aviation, Vol. 41, No. 5, May, 1942, p. 185.)

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32	8557	G.B.	*Air/Sea Rescue Launches of the R.A.F.* (Engineer, Vol. 175, No. 4,550, 26/3/43, pp. 250-251.)
33	8619	G.B.	*Electro-Magnetic Mine-Exploding Ring Fitted on a Wellington Bomber (Photo).* (Aeroplane, Vol. 64, No. 1,651, 15/1/43, p. 60.)
34	8634	U.S.A. ...	*Martin "Mars" Receives American Design Reward.* (U.S. Air Services, Vol. 27, No. 8, Aug., 1942, p. 17.)
35	8641	G.B.	*Longitudinal Stability in Fighters.* (W. E. Hick, Aeronautics, Vol. 7, No. 4, Nov., 1942, pp. 32-34.)
36	8654	U.S.A. ...	*Contra-Rotating Airscrew on Douglas B-23.* (Aeroplane, Vol. 64, No. 1,657, 26/2/43, p. 233.)
37	8680	U.S.A. ...	*North American P-51 Mustang Fitted with Wooden Wheels (Ground Resting Only) (Photo).* (Aeroplane, Vol. 64, No. 1,660, 19/3/43, p. 324.)
38	8682	G.B. and U.S.A. ..	*Aircraft Maintenance in the Desert (includes Photos of Aircraft).* (R. Toland, Aeroplane, Vol. 64, No. 1,660, 19/3/43, pp. 332-334.)
39	8692	U.S.A. ..	*Vought-Sikorsky Military Helicopter (New Features) (Photograph).* (Aeroplane, Vol. 64, No. 1,661, 26/3/43, p. 352.)
40	8698	G.B.	*Air/Sea Rescue Service and the New R.A.F. Dinghy (including Equipment).* (Aeroplane, Vol. 64, No. 1,661, 26/3/43, pp. 358-359.)
41	8775	G.B.	*New Anson Trainer with Plywood Fuselage.* (Flight, Vol. 43, No. 1,784, 4/3/43, p. 222.)
42	8782	U.S.A. and Japan ...	*Japanese Views on American Aircraft.* (Flight, Vol. 43, No. 1,784, 4/3/43, p. 229.)
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44	8798	U.S.S.R. and France ...	*Notes on and Drawings of Some Light Bombers (Russian and French).* (Aeronautics, Vol. 8, No. 1, Feb., 1943, p. 33.)
45	8811	G.B.	*Dihedral Tailplane of Bristol Beaufighter (Photo).* (Aeronautics, Vol. 8, No. 1, Feb., 1943, p. 72.)
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47	8256	G.B.	*Development of British Aircraft Armament.* (Aero Digest, Vol. 41, No. 6, Dec., 1942, pp. 179-183 and 287-288.)
48	8380	Germany ..	*German Aircraft Armament (Types of Guns).* (Inter. Avia., No. 850, 2/1/43, p. 10.)
49	8381	U.S.A. ...	*Boeing B-17F (Forward Guns) (Photo).* (Inter. Avia., No. 850, 2/1/43, p. 1.)
50	8500	U.S.A. ...	*Passive Defence. The Protective Armouring of Military Aircraft.* (Horace J. Alter, Paper read before the 11th Annual Meeting of the Inst. of Aeron. Sci.)

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53	8671	Germany	...	*Ju. 88E with New Forward Firing Armament (Photo).* (Aeroplane, Vol. 64, No. 1,660, 19/3/43, p. 318.)
54	8687	G.B.	...	*Cannon for Coastal Command Aircraft.* (Aeroplane, Vol. 64, No. 1,661, 26/3/43, p. 347.)
55	8707	G.B.	...	*Fraser-Nash Hydraulic Rear Turret Mounting—Four Machine Guns.* (Aeroplane, Vol. 64, No. 1,661, 26/3/43, p. 372.)
56	8753	G.B.	...	*Bristol Beaufighter with Vickers K Gun in Dorsal Cupola (Photo).* (Aeroplane, Vol. 64, No. 1,659, 12/3/43, p. 308.)
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58	8292	Germany	...	*External Heating Device for Torpedoes Carried on Aircraft. (Pat. series 47, No. 727,307.)* (Arado, Flugsport, Vol. 35, No. 3, 3/2/43, p. 192.)
59	8293	Germany	...	*Hoisting Device for Bombs (Bomb Load). (Pat. series 47, No. 727,599.)* (Heinkel, Flugsport, Vol. 35, No. 3, 3/2/43, p. 192.)
60	8294	Germany	...	*Bomb Stowage in Aircraft. (Pat. series 47, No. 729,522.)* (M. W. Neubrandenburg, Flugsport, Vol. 35, No. 3, 3/2/43, pp. 192-193.)
61	8458	U.S.A.	...	*Bomb Fin Shipping Case Made of Pressed Wood.* (Ind. and Eng. Chem., Vol. 21, No. 3, 20/2/43, p. 187.)
62	8620	G.B.	...	*Parachute Bombs being Loaded on a Hampden Bomber (Photo).* (Aeroplane, Vol. 64, No. 1,651, 15/1/43, p. 62.)
63	8679	G.B.	...	8,000 *lb. Bomb Shown Beside a 500-Pounder.* (Aeroplane, Vol. 64, No. 1,660, 19/3/43, p. 324.)
64	8716	Germany	...	*German Report of the New R.A.F. Flares.* (Flight, Vol. 43, No. 1,787, 25/3/43, p. 310.)
65	8817	France	...	*French Researches on Explosives (Digest):* (1) *A New Method for Testing Detonators;* (2) *Combustion and Detonation of Mercury Fulminate;* (3) *Effect of High Gas Pressure on Detonators;* (4) *The Sensitivity of Tetrenitromethane-toluene Mixtures;* (5) *Optical Phenomena Accompanying Detonation;* (6) *Effect of Pressure on Combustion Velocity of Smokeless Powders.* (H. Maraour, Z.G.S.S., Vol. 37, No. 10, Oct., 1942, pp. 189-192.)
66	8827	Germany	...	*Internal Ballistics—Effect of Gas Inertia with Special Reference to the Acceleration of the Charge.* (H. Pfriehm, Z.G.S.S., Vol. 38, No. 1, Jan., 1943, pp. 1-4.)

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68	8217	G.B.	*Bristol Beaufighter (Photo and Silhouette).* (Inter. Avia., No. 848-849, 21/12/42, p. 1.)
69	8219	G.B.	*New Model Spitfire with Merlin 61 Engine.* (Inter. Avia., No. 847, 10/12/42, pp. 1 and 8-9.)
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72	8518	G.B.	*Westland "Whirlwind."* (Aviation, Vol. 41, No. 5, May, 1942, pp. 203-256.)
73	8521	G.B.	*Hurricane with Camouflage Net in Russia (Photo).* (Aviation, Vol. 41, No. 5, May, 1942, p. 222.)
74	8619	G.B.	*Spitfire—IX—Fighters in Flight (Photo).* (Aeroplane, Vol. 64, No. 1,651, 15/1/43, p. 59.)
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87	8749	G.B.	*Typhoons and Whirlwinds at Work (Formation Photo of Whirlwinds).* (Aeroplane, Vol. 64, No. 1,659, 12/3/43, pp. 312-313.)
88	8755	G.B.	*D.H. "Mosquito" Made of Wood (Photo).* (Aeroplane, Vol. 64, No. 1,659, 12/3/43, p. 302.)
89	8791	G.B.	*Supermarine Spitfire—IX (Recognition Details).* (Flight, Vol. 63, No. 1,788, 1/4/43, p. a.)

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91	8799	G.B.	*Mosquito and Spitfire Nine.* (Aeronautics, Vol. 8, No. 1, Feb., 1943, pp. 36-41.)
92	8807	G.B.	*Spitfire—IX.* (Aeronautics, Vol. 8, No. 1, Feb., 1943, p. 62.)
93	8880	G.B. and Canada ...	*Avro Anson Trainer, Built in Canada (Plastic Plywood Fuselage).* (Inter. Avia., No. 854-855, 3/2/42, pp. 2 and 18.)
94	8884	G.B.	*De Havilland Mosquito Light Bomber.* (Inter. Avia., No. 852-853, 25/1/43, pp. 1 and 8.)
95	8885	G.B.	*Hawker Typhoon Fighter.* (Inter. Avia., No. 852-853, 25/1/43, p. 8.)
96	8886	G.B.	*Bristol Bisley Light Bomber.* (Inter. Avia., No. 852-853, 25/1/42, pp. 8-9.)
			Military Types (U.S.A.).
97	8167	U.S.A. ...	*Martin "Mariner" Patrol Bomber (Flying Boat).* (Inter. Avia., No. 847, 10/12/42, p. 15.)
98	8169	U.S.A. ...	*Martin B-26 Medium Bomber (Marauder or Martian).* (Inter. Avia., No. 847, 10/12/42, p. 15.)
99	8171	U.S.A. ...	*Ryan Observation Aircraft.* (Inter. Avia., No. 847, 10/12/42, pp. 15-16.)
100	8178	U.S.A. ...	*Lockheed P-38 Lightning.* (Inter. Avia., No. 847, 10/12/42, p. 1.)
101	8179	U.S.A. ...	*Vought-Sikorsky F.4U-1 "Corsair" (Carrier Bomber Fighter).* (Inter. Avia., No. 847, 10/12/42, pp. 1 and 14.)
102	8211	U.S.A. ...	*Republic P-47 "Thunderbolt."* (Inter. Avia., No. 848-849, 21/12/42, p. 15.)
103	8215	U.S.A. ...	*Consolidated PB.2Y Coronado (Patrol Bomber) (Photo).* (Inter. Avia., No. 848-849, 21/12/42, p. 1.)
104	8259	U.S.A. ...	*Vultee Vengeance (showing Diving Brakes) (Photo).* (Aero Digest, Vol. 41, No. 6, Dec., 1942, p. 114.)
105	8216	U.S.A. ...	*North American NA-73 Mustang (Photo).* (Inter. Avia., No. 848-849, 21/12/42, p. 1.)
106	8218	U.S.A. ...	*Ryan PT-25 Plywood Trainer (Photo).* (Inter. Avia., No. 848-849, 21/12/42, p. 1.)
107	8264	U.S.A. ...	*Republic P.47 Thunderbolt.* (Aero Digest, Vol. 41, No. 6, Dec., 1942, p. 138.)
108	8282	U.S.A. ...	*Stinson "Sentinel" Observation Plane (Photo).* (Aero Digest, Vol. 41, No. 6, Dec., 1942, p. 380.)
109	8283	U.S.A. ...	*Consolidated "Coronado."* (Flugsport, Vol. 35, No. 4, 17/2/43, pp. 40-41.)
110	8303	U.S.A. ...	*Fairchild AT.13 Trainer.* (Inter. Avia., No. 846, 30/11/42, p. 7.)
111	8304	U.S.A. ...	*Vought-Sikorsky F.4U-1 Carrier Fighter "Corsair."* (Inter. Avia., No. 846, 30/11/42, pp. 7-8.)
112	8305	U.S.A. ...	*Brewster SB.2A-1 Buccaneer Dive Bomber.* (Inter. Avia., No. 846, 30/11/42, p. 8.)

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113	8310	U.S.A.	...	*Vultee Trainer BT-13 now Made of Steel (Expanded Metal and Welding).* (Inter. Avia., No. 846, 30/11/42, p. 10.)
114	8383	U.S.A.	...	*Beech AT-11 Trainer (Photo).* (Inter. Avia., No. 850, 2/1/43, p. 1.)
115	8419	U.S.A.	...	*Douglas "Dauntless" Dive Bombers (Photo).* (Aero Digest, Vol. 42, No. 1, Jan., 1943, p. 100.)
116	8437	U.S.A.	...	*Lockheed "Lightning" (Photo).* (Aero Digest, Vol. 42, No. 1, Jan., 1943, p. 233.)
117	8439	U.S.A.	...	*Martin Marauder (Photo).* (Aero Digest, Vol. 42, No. 1, Jan., 1943, pp. 244-245.)
118	8513	U.S.A.	...	*Taylorcraft L-57A Liaison Plane for A.A.F. (Photo).* (Aviation, Vol. 41, No. 5, May, 1942, p. 185.)
119	8515	U.S.A.	...	*Grumman B-44 Used as Instrument Trainer (Photo).* (Aviation, Vol. 41, No. 5, May, 1942, p. 197.)
120	8516	U.S.A.	...	*North American AT.6 Trainer Made of Steel and Wood (Photo).* (Aviation, Vol. 41, No. 5, May, 1942, p. 219.)
121	8517	U.S.A.	...	*Transition Trainers (Beech AT-10, Cessna "Bobcat," Cessna "Crane" Curtiss AT-9) (Photo).* (Aviation, Vol. 41, No. 5, May, 1942, pp. 201 and 255-256.)
122	8548	U.S.A.	...	*The Thunderbolt in Action (Photo).* (Sci. Am., Vol. 168, No. 1, Jan., 1943, p. 40.)
123	8621	U.S.A.	...	*Boeing Fortress II Bombers on Aerodrome (Photo).* (Aeroplane, Vol. 64, No. 1,651, 15/1/43, p. 63.)
124	8633	U.S.A.	...	*Boeing "Sea Ranger" (Photograph).* (U.S. Air Services, Vol. 27, No. 8, Aug., 1942, p. 16.)
125	8647	U.S.A.	...	*Curtiss Hell Diver (Photograph).* (Aeronautics, Vol. 7, No. 4, Nov., 1942, p. 61.)
126	8648	U.S.A.	...	*Martin Baltimore (Photo).* (Aeronautics, Vol. 7, No. 4, Nov., 1942, p. 83.)
127	8656	U.S.A.	...	*Boeing B-17FS Bombers in Flight.* (Aeroplane, Vol. 64, No. 1,657, 26/2/42, p. 234.)
128	8662	G.B. and U.S.A.	...	*American and British Trainers.* (Aeroplane, Vol. 64, No. 1,657, 26/2/43, p. 244-247.)
129	8676	U.S.A.	...	*Boeing B-17E (Fortress II) (Photo).* (Aeroplane, Vol. 64, No. 1,660, 19/3/43, p. 321.)
130	8677	U.S.A.	...	*Glenn Martin B-26 "Marauder" Bomber (Photo).* (Aeroplane, Vol. 64, No. 1,660, 19/3/43, p. 322.)
131	8694	U.S.A.	...	*A Vultee Vengeance I Dive Bomber (Air Brakes in Open Position) (Photograph).* (Aeroplane, Vol. 64, No. 1,661, 26/3/43, p. 353.)
132	8699	U.S.A.	...	*The Martin Marauder I (B-26A) (Silhouette).* (Aeroplane, Vol. 64, No. 1,664, 26/3/43, pp. 360-361.)
133	8700	U.S.A.	...	*The Douglas A-24 Dauntless (Recognition Details).* (Aeroplane, Vol. 64, No. 1,661, 26/3/43, pp. 362-363.)
134	8701	U.S.A.	...	*The Grumman TBF-1 (Recognition Details).* (Aeroplane, Vol. 64, No. 1,661, 26/3/43, pp. 362-363.)
135	8709	U.S.A.	...	*Coastal Command Fortress (Photograph).* (Flight, Vol. 43, No. 1,787, 25/3/43, p. 300.)

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136	8741	U.S.A.	...	*Ryan P.T.-25 Plastic-Bonded Plywood Trainer.* (Aviation, Vol. 41, No. 10, Oct., 1942, pp. 235 and 285-286.)
137	8743	U.S.A.	...	*North American Mitchells Over the Mediterranean (Photo).* (Aeroplane, Vol. 64, No. 1,659, 12/3/43, p. 295.)
138	8744	U.S.A.	...	*Curtiss A-25 Banshee (Military Dive Bomber) (Photo).* (Aeroplane, Vol. 64, No. 1,659, 12/3/43, p. 296.)
139	8750	U.S.A.	...	*American Aircraft in Service—VII. Lockheed C-56, "Lodestar"; Fairchild C-61, "Forwarder"; Lockheed C-63, "Noorduyn"; C-64a; Lockheed C-69, "Constellation"; Curtiss C-76, "Caravan."* (Aeroplane, Vol. 64, No. 1,659, 12/3/43, p. 311.)
140	8752	G.B.	...	*Bristol "Beaufighter" (Photo).* Aeroplane, Vol. 64, No. 1,659, 12/3/43, p. 308.)
141	8756	U.S.A.	...	*Consolidated PB2Y-2 "Coronado" (Photo).* (Aeroplane, Vol. 64, No. 1,659, 12/3/43, p. 303.)
142	8778	U.S.A.	...	*Ventura (Photograph).* (Flight, Vol. 43, No. 1,784, 4/3/43, p. 219.)
143	8781	U.S.A.	...	*Douglas Skymaster C-54 (Recognition Details).* (Flight, Vol. 43, No. 1,784, 4/3/43, p. b.)
144	8789	U.S.A.	...	*Bostons in North Africa (Photograph).* (Flight, Vol. 63, No. 1,788, 1/4/43, p. 327.)
145	8795	U.S.A.	...	*The Ventura for Anti-Submarine Work (Photograph).* (Flight, Vol. 63, No. 1,788, 1/4/43, p. 349.)
146	8805	U.S.A.	...	*Flying Fortress IIs, Boeing B17Es (Photo).* (Aeronautics, Vol. 8, No. 1, Feb., 1943, p. 54.)
147	8806	U.S.A.	...	*Lockheed P.38 Lightning (Photo).* (Aeronautics, Vol. 8, No. 1, Feb., 1943, p. 56.)
148	8870	U.S.A.	...	*Lockheed "Ventura" Bomber.* (Inter. Avia., No. 854-855, 3/2/43, pp. 7-8.)
149	8871	U.S.A.	...	*Martin Martian (Marauder) Bomber B-26B.* (Inter. Avia., No. 854-855, 3/2/43, pp. 2 and 8.)
150	8872	U.S.A.	...	*Curtiss S.B. 2C-1 Dive Bomber (Helldiver).* (Inter. Avia., No. 854-855, 3/2/43, p. 8.)
151	8873	U.S.A.	...	*Brewster Types (Bermuda, Blaster and Battler).* (Inter. Avia., No. 854-855, 3/2/43, pp. 1 and 8-9.)
152	8874	U.S.A.	...	*Bell P-57 Fighter.* (Inter. Avia., No. 854-855, 3/2/43, pp. 1 and 8-9.)
153	8875	U.S.A.	...	*Vultee-Stinson Liaison Plane "Sentinel" (L-5).* (Inter. Avia., No. 854-855, 3/2/43, pp. 9-10.)
154	8876	U.S.A.	...	*Ryan Trainer PT-25.* (Inter. Avia., No. 854-855, 3/2/43, p. 10.)
				Military Types (U.S.S.R.).
155	8214	U.S.S.R.	...	*Russian LAGG-3 Fighter.* (Inter. Avia., No. 848-849, 21/12/42, p. 18.)
156	8686	U.S.S.R.	...	*A Flight of 11-2 Stormovik Fighter-Bombers (showing After Gun Position) (Photograph).* (Aeroplane, Vol. 64, No. 1,661, 26/3/43, p. 346.)
157	8693	U.S.S.R.	...	*MIG-3 Fighter of the Red Air Fleet (Photograph)* (Aeroplane, Vol. 64, No. 1,661, 26/3/43, p. 352.)

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158	8812	U.S.S.R. ...	*Russian Trainers (Yu.28) in Action.* (Aeronautics, Vol. 8, No. 1, Feb., 1943, p. 72.)
			Military Types (Germany).
159	8371	Germany ...	*Junkers Ju. 89 and 905 Long Range Bomber.* (Inter. Avia., No. 850, 2/1/43, p. 1 and 8-9.)
160	8382	Germany ...	*Henschel Hs. 129 Bomber (Photo).* (Inter. Avia., No. 850, 2/1/43, p. 1.)
161	8404	Germany ...	*High Altitude Ju. 86.* (Engineer, Vol. 175, No. 4,549, 19/3/43, p. 242.)
162	8405	Germany ...	*Me. 323—Six-Engined "Powered Glider."* (Engineer, Vol. 175, No. 4,549, 19/3/43, p. 242.)
163	8642	Germany ...	*German Aircraft Silhouettes (Ju. 286, Ju. 290, He. 116 and Henschel 129).* (Aeronautics, Vol. 7, No. 4, Nov., 1942, p. 35.)
164	8658	Germany ...	*Dornier D.O. 172 in Tripolitania.* (Aeroplane, Vol. 64, No. 1,657, 26/2/43, p. 235.)
165	8678	Germany ...	*Dornier Do. 18K1 Flying Boat (Photo).* (Aeroplane, Vol. 64, No. 1,660, 19/3/43, p. 323.)
166	8688	Germany ...	*The Dornier Do. 217E2 (Photograph).* (Aeroplane, Vol. 64, No. 1,661, 26/3/43, p. 348.)
167	8719	Germany ...	*Messerschmitt Me. 210 (Recognition Details).* (Flight, Vol. 43, No. 1,787, 25/3/43, p. a.)
168	8720	Germany ...	*Henschel Hs. 129 (Recognition Details).* (Flight, Vol. 43, No. 1,787, 25/3/43, p. b.)
169	8740	Germany ...	*Focke-Wulf 190 A3.* (Aviation, Vol. 41, No. 10, Oct., 1942, pp. 233 and 306-308.)
170	8754	Germany and U.S.A. ...	*Arado AR. 196A and Vought Sikorsky OS2U-3 Kingfisher I (Recog. Details).* (Aeroplane, Vol. 64, No. 1,659, 12/3/43, pp. 304-305.)
171	8773	Germany ...	*Ju. 52 on the Russian Front (Photograph).* (Flight, Vol. 43, No. 1,784, 4/3/43, p. 220.)
172	8783	Germany ...	*Henschel Hs. 129 (Photograph).* (Flight, Vol. 43, No. 1,784, 4/3/43, p. 229.)
173	8810	Germany ...	*B.V. 222 Flying Boat.* (Aeronautics, Vol. 8, No. 1, Feb., 1943, p. 71.)
174	8847	Germany ...	*Focke-Wulf F.W. 200C (Photograph).* (Flugsport, Vol. 35, No. 4, 17/2/43, p. 47.)
			Military Types (Italy).
175	8176	Italy	*Reggiane Re. 2001 Single-Seat Fighter.* (Inter. Avia., No. 847, 10/12/42, pp. 13-14.)
176	8226	Italy	*New Italian Aircraft Types (Pressure Cabin Piazzio P. 111 and Development of Fiat G. 50).* (Inter. Avia., No. 851, 12/1/43, p. 13.)
177	8230	Italy	*Piazzo Four-Engine Bomber P. 108.* (Flugsport, Vol. 35, No. 5, 3/3/43, pp. 54-55.)
178	8317	Italy	*Piazzo P. 108 Four-Engined Long Range Bomber.* (Inter. Avia., No. 846, 30/11/42, pp. 1 and 17.)
179	8784	Italy	*Fiat G. 50 (Photograph).* (Flight, Vol. 43, No. 1,784, 4/3/43, p. 229.)
			Military Types (France).
180	8894	France ...	*N.C. 420 Seaplane (Training and Patrol).* (Inter. Avia., No. 852-853, 25/1/43, p. 13.)
181	8895	France ...	*Cannes 1030 Light Bomber.* (Inter. Avia., No. 852-853, 25/1/43, pp. 13-14.)

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			Military Types (Mexico).
182	8711	Mexico ...	*New Mexican Trainer—Teziutlan.* (Flight, Vol. 43, No. 1,787, 25/3/43, p. 304.)
			Military Types (Japan).
183	8623	Japan ...	*Japanese Para-Troops Descending from Mitsubishi M.C.-20 Bombers (Photo).* (Aeroplane, Vol. 64, No. 1,651, 15/1/43, p. 65.)
			Troop Transport and Ambulance.
184	8180	U.S.A. ...	*Vought-Sikorsky VS-44 Transport Plane.* (Inter. Avia., No. 847, 10/12/42, p. 15.)
185	8222	U.S.A. ...	*Curtiss C-76 Transport "Caravan."* (Inter. Avia., No. 851, 12/1/43, p. 7.)
186	8227	Italy	*Italian Ambulance Aircraft (Caproni Ca. 309 and 133, Cant Z. 506 and Savoia-Marchette S.M. 81).* (Inter. Avia., No. 851, 12/1/43, pp. 13-14.)
187	8231	Japan ...	*Japanese Transport Flying Boat (Four-Engined) (Photo).* (Flugsport, Vol. 35, No. 5, 3/3/42, p. 55.)
188	8319	U.S.A. ...	*Douglas D.C.-4 Four-Engine Transport (Photo).* (Inter. Avia., No. 846, 30/11/42, p. I.)
189	8320	U.S.A. ...	*Curtiss C-76 Twin-Engined Transport.* (Inter. Avia., No. 846, 30/11/42, p. 7.)
190	8428	U.S.A. ...	*Curtiss "Caravan."* (Aero Digest, Vol. 42, No. 1, Jan., 1943, pp. 186-188.)
191	8433	U.S.A. ...	*The Lockheed "Constellation."* (Aero Digest, Vol. 42, No. 1, Jan., 1943, pp. 212-214, 322-323.)
192	8617	Germany ...	*Junkers Ju. 290 Heavy Transport (Photo).* (Aeroplane, Vol. 64, No. 1,651, 15/1/43, p. 58.)
193	8628	U.S.A. ...	*Curtiss C-76 Caravan Transport (Photo).* (Aeroplane, Vol. 64, No. 1,651, 15/1/43, p. 80.)
194	8631	U.S.A. ...	*Martin "Mars" Flying Boat (Photo).* (U.S. Air Services, Vol. 27, No. 8, Aug., 1942, p. 10.)
195	8632	U.S.A. ...	*Curtiss "Commando" Military Transport (Photograph).* (U.S. Air Services, Vol. 27, No. 8, Aug., 1942, p. 11.)
196	8663	G.B.	*D.H. "Flamigo" (Transport) and H.P. 52 Hampden I (Recognition Details).* (Aeroplane, Vol. 64, No. 1,657, 26/2/43, pp. 254-255.)
197	8684	U.S.A. ...	*Douglas DC-4 "Skymaster" Transport (Photo).* (Aeroplane, Vol. 64, No. 1,660, 19/3/43, p. 340.)
198	8695	France ...	*The Brequet 500 Two-Motor Transport Monoplane.* (Aeroplane, Vol. 64, No. 1,661, 26/3/43, p. 354.)
199	8718	Germany ...	*Ju. 52 Transport Planes (Photograph).* (Flight, Vol. 43, No. 1,787, 25/3/43, p. 310.)
200	8742	U.S.A. ...	*Hot Air Generator and Hoods on Lockheed 10 Transport (Photo).* (Aeroplane, Vol. 64, No. 1,659, 12/3/43, p. 293.)
201	8748	U.S.A. ...	*The Lockheed Constellation.* (Aeroplane, Vol. 64, No. 1,659, 12/3/43, p. 314.)
202	8780	U.S.A. ...	*Martin Mars (Recognition Details).* (Flight, Vol. 43, No. 1,784, 4/3/43, p. a.)
203	8797	G.B.	*Trooper into Transport.* (No. Macmillan, Aeronautics, Vol. 8, No. 1, Feb., 1943, pp. 28-31.)

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204	8868	U.S.A.	...	*Curtiss C-76 Transport "Caravan."* (Inter. Avia., No. 854-855, 3/2/43, pp. 2 and 7.)
205	8869	U.S.A.	...	*Lockheed L-46 Transport "Constellation" C-69.* (Inter. Avia., No. 854-855, 3/2/43, pp. 1 and 7.)
206	8887	G.B. ...	...	*Transport Aircraft "York" (Conversion of Lancaster).* (Inter. Avia., No. 852-853, 25/1/43, p. 9.)
207	8891	U.S.A.	...	*Lockheed C-69 Transport "Constellation."* (Inter. Avia., No. 852-853, 25/1/43, p. 12.)
208	8892	U.S.A.	...	*Curtiss C-76 "Caravan" Transport.* (Inter. Avia., No. 852-853, 25/1/42, p. 12.)
209	8896	France	...	*Large Flying Boats (Potez Sean 161, S.E. 200 Latécoère 631).* (Inter. Avia., No. 852-853, 25/1/43, p. 14.)
210	8809	U.S.A.	...	*Consolidated C-87 (Transport).* (Aeronautics, Vol. 8, No. 1, Feb., 1943, p. 67.)
				Gliders.
211	8170	G.B. ...	...	*Large British Glider "Horsawith."* (Inter. Avia., No. 847, 10/12/42, p. 11.)
212	8229	France	...	*High Performance Sail Plane Manboussin C. 302.* (Flugsport, Vol. 35, No. 5, 3/3/43, p. 54.)
213	8307	U.S.A.	...	*15-Seat Glider GG-4a Built by Ford.* (Inter. Avia., No. 846, 30/11/42, p. 9.)
214	8660	U.S.A.	...	*Amphibian Glider being Towed by Consolidated PBY.5.* (Aeroplane, Vol. 64, No. 1,657, 26/2/43, p. 238.)
215	8704	U.S.A.	...	*Increased Freight Capacity with Towed Gliders.* (Aeroplane, Vol. 64, No. 1,661, 26/3/43, p. 370.)
216	8774	Germany	...	*German D.F.S. 230 Glider in Tow on Desert Airfield (Photograph).* (Flight, Vol. 43, No. 1,784, 4/3/43, p. 221.)
217	8779	G.B. ...	...	*Horsa Glider (Photograph).* (Flight, Vol. 43, No. 1,784, 4/3/43, p. 241.)
218	8804	G.B. ...	...	*Gliding into Battle (Glider Training).* (R. C. Collins, Aeronautics, Vol. 8, No. 1, Feb., 1943, pp. 50-51.)
219	8846	Germany	...	*French Sail Plane "Ailette" C. 3015.* (Flugsport, Vol. 35, No. 4, 17/2/43, pp. 39-40.)
220	8855	France	...	*French Sail Plane "Holste 20-P.1."* (Flugsport, Vol. 35, No. 3, 3/2/43, pp. 29-30.)
221	8882	G.B. ...	...	*Airspeed Horsa Transport Glider (Photo).* (Inter. Avia., No. 854-855, 3/2/43, p. I.)
222	8889	G.B. ...	...	*Airspeed "Horsa" Glider.* (Inter. Avia., No. 852-853, 25/1/42, p. 9.)
223	8897	Germany	...	*Horten IV Flying Wing Glider (Constructional Details).* (G. Horten, Flugsport, Vol. 35, No. 6, 17/3/43, pp. 63-67.)
				Fleet Air Arm.
224	8398	G.B. ...	...	*Fleet Air Arm (Fighter Equipment).* (Alexander, Engineer, Vol. 175, No. 4,549, 19/3/43, p. 229.)
225	8608	U.S.A.	...	*Grumman "Wildcat" (Navy Fighter) (Photograph).* (Am. Av., Vol. 222, No. 10, 15/10/42, p. 3.)

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226	8636	U.S.A.	...	*Navy Vought "Corsair" with Double Wasp Engine (Photo).* (U.S. Air Services, Vol. 27, No. 8, Aug., 1942, p. 32.)
227	8673	G.B. ...	...	*Helicopters for Marine Protection.* (Aeroplane, Vol. 64, No. 1,660, 19/3/43, p. 320.)
228	8710	Japan	...	*Japanese Navy 97 Fighter (Photograph).* (Flight, Vol. 43, No. 1,787, 25/3/43, p. 301.)
229	8787	G.B. ...	...	*Aircraft in the Navy (Debate in the House of Lords).* (Flight, Vol. 43, No. 1,784, 4/3/43, p. 233.)
230	8890	U.S.A.	...	*Curtiss SOC3-1 "Seagull" (Navy Observation).* (Inter. Avia., No. 852-853, 25/1/43, pp. 11-12.)
				Aircraft Carriers, Maintenance Float Platforms.
231	8175	G.B. and U.S.A.	...	*British and American Aircraft Carriers.* (Inter. Avia., No. 847, 10/12/42, pp. 22-24.)
232	8703	G.B. ...	...	*Maintenance Platforms Afloat.* (Aeroplane, Vol. 64, No. 1,661, 26/3/43, p. 370.)
233	8879	U.S.A.	...	*New American Aircraft Carrier.* (Inter. Avia., No. 852-853, 25/1/43, p. 22.)
				A.R.P. and A.A.
234	8153	Germany	...	*Factory Hands Manning A.A. Batteries (Photo).* (Der Adler, No. 2, 26/1/43, p. 40.)
235	8358	U.S.A.	...	*Protection of Foodstuffs Against War Gases.* (S. H. Katz, Ind. and Eng. Chem. (Ind. Ed.), Vol. 35, No. 1, Jan., 1943, pp. 20-23.)
236	8450	U.S.A.	...	*Windowless Black-Out Factory.* (Ind. and Eng. Chem., Vol. 21, No. 3, 20/2/43, p. 190.)
237	8541	U.S.A.	...	*New Fireproof Plaster as Protection Against Incendiary Bombs.* (Sci. Am., Vol. 168, No. 1, Jan., 1943, p. 28.)
238	8715	Germany	...	*German A.R.P.* (Flight, Vol. 43, No. 1,787, 25/3/43, p. 310.)
239	8737	U.S.A.	...	*Blimps of the U.S. Coastal Patrol.* (R. G. Picinich, Aviation, Vol. 41, No. 10, Oct., 1942, pp. 207 and 306.)
				Aero and Hydrodynamics.
				Wind Tunnel Research.
240	8204	Germany	...	*Flight Research and Testing at Various German Aircraft Works (Junkers, etc.).* (C. Cornelius and others, Luftwelt, Vol. 10, No. 2, 15/1/43, pp. 22-33.)
241	8269	U.S.A.	...	*Practical Aerodynamics of the Spin.* (C. H. Tweeny, Aero Digest, Vol. 41, No. 6, Dec., 1942, pp. 164-166 and 271.)
242	8431	U.S.A.	...	*C.W. Builds 750 m.p.h. Wind Tunnel and High Altitude Test Chamber.* (Aero Digest, Vol. 42, No. 1, Jan., 1943, p. 202.)
243	8570	G.B. ...	...	*An Experimental Investigation of Wind Tunnel Interference in the R.A.E. 5 ft. Open Jet Circular Tunnel.* (J. E. Adamson, R. and M., No. 1,897.)

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244	8571	G.B. ...	... *Tests on Aerofoil N.A.C.A. 23,012 in the Compressed Air Tunnel.* (D. H. Williams and others, R. and M., No. 1,898.)
245	8696	U.S.A.	... *New American Wind Tunnel* (*Max. Speed 700 m.p.h.*). (Aeroplane, Vol. 64, No. 1,661, 26/3/43, p. 354.)
246	8848	Germany	... *The Application of Wind Tunnel Measurements to Aircraft Models* (*Scale Effect*). (Flugsport, Vol. 35, No. 4, 17/2/43, pp. 48-51.)
247	8877	U.S.A.	... *North American 300 m.p.h. Wind Tunnel* (*11 ft. by 7 ft. 8 in.*). (Inter. Avia., No. 854-855, 3/2/43, p. 11.)
			Heat Transfer, Boundary Layer.
248	8201	U.S.A.	... *Theory of Heat Transfer in Smooth and Rough Pipes.* (G. D. Mattioli, Forschung, Vol. 11, No. 4, July-Aug., 1940, pp. 149-158.) (R.T.P. Translation No. T.M. 1,037.) (N.A.C.A. Tech. Memo. No. 1,037, Dec., 1942.)
249	8203	U.S.A.	... *Pressure Distribution in Non-Uniform Two-Dimensional Flow.* (M. Schwabe, Ing. Archiv., Vol. VI, No. 1, Feb., 1935, pp. 34-50.) (R.T.P. Translation T.M. 1,039.) (N.A.C.A. Tech.Memo. 1,039.)
250	8349	U.S.S.R.	... *Heat Transfer and Friction in the Turbulent Boundary Layer of a Compressible Gas at High Speeds.* (F. Frankl and V. Voishel, C.A.H.I., No. 240, Moscow, 1935.) (R.T.P. Trans. No. T.M. 1,032, N.A.C.A. Tech. Memo. 1,032, Oct., 1942.)
251	8568	G.B. ...	... *Wood Smoke as a Means of Visualising Boundary Layer Flow at High Reynolds Number.* (J. H. Preston, J. Roy. Aeron. Soc., Vol. 47, No. 387, March, 1943, pp. 93-102.)
			Hydrodynamics.
252	8587	G.B. ...	... *Tidal Power* (*1920 to Date*). (Sci. Lib. Bibliog. Series, No. 579.)

Aircraft, Airscrews and Accessories.

			Civil and Special Types.
253	8172	Germany	... *German Cargo Aircraft S.O.R.-1.* (Inter. Avia , No. 847, 10/12/42, pp. 11-13.)
254	8210	Germany	... *Ju. 290 Cargo Plane.* (Inter. Avia., No. 848-849, 21/12/42, p. 12.)
255	8212	U.S.A.	... *American Cargo Planes* (*C-54, C-47, C-67, etc.*). (Inter. Avia., No. 848-849, 21/12/42, p. 16.)
256	8609	U.S.A.	... *Douglas Cargo Carriers.* (Am. Av., Vol. 222, No. 10, 15/10/42, p. 23.)
257	8664	G.B. ...	... *Blackburn "Kangaroo" (British Bomber of 1916, Historical Interest).* (Aeroplane, Vol. 64, No. 1,657, 26/2/43, p. 257.)
258	8674	U.S.A.	... *Vought-Sikorsky V.S.-300 Experimental Helicopter.* (Aeroplane, Vol. 64, No. 1,660, 19/3/43, p. 320.)

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259	8683	G.B.	*Lighter-Borne Sopwith "Camel"* (1918 *Fighter Plane*) (*Hist.*). (Aeroplane, Vol. 64, No. 1,660, 19/3/43, p. 341.)
260	8689	G.B.	*Heston Racer for World's Speed Record* (*Photograph*). (Aeroplane, Vol. 64, No. 1,661, 26/3/43, p. 349.)
261	8705	G.B.	*The Parnall Pixie, Mark I and II*—1923. (Aeroplane, Vol. 64, No. 1,661, 26/3/43, p. 371.)
262	8714	Germany ...	*German Projects for New Types of Civil Aircraft.* (Flight, Vol. 43, No. 1,787, 25/3/43, p. 310.)
263	8893	France ...	*Breguet 500 Commercial Transport.* (Inter. Avia., No. 852-853, 25/1/43, p. 13.)
			Design, Construction and Equipment.
264	8150	U.S.A. ...	*Elimination of Unnecessary Weight in Aircraft.* (M. Boe, Aero Digest, Vol. 41, No. 6, Dec., 1942, pp. 154-158.)
265	8241	Germany ...	*Retractable Undercarriage for Tailless Aircraft.* (Messerschmitt, Flugsport, Vol. 35, No. 5, 3/3/43, p. 204.)
266	8261	U.S.A. ...	*New Uses of Plastics in Aircraft.* (K. Wordson, Aero Digest, Vol. 41, No. 6, Dec., 1942, pp. 126-276.)
267	8263	U.S.A. ...	*Hydraulic Pressure Accumulators.* (N. de Kiss, Aero Digest, Vol. 41, No. 6, Dec., 1942, pp. 130-138.)
268	8265	U.S.A. ...	*Nose Wheel Shimmy Dampers.* (C. M. Morgan, Aero Digest, Vol. 41, No. 6, Dec., 1942, pp. 142-151 and 275.)
269	8271	U.S.A. ...	*Hydraulic Control Standardisation.* (J. W. Kelly, Aero Digest, Vol. 41, No. 6, Dec., 1942, pp. 211-218 and 276-279.)
270	8273	U.S.A. ...	*Remote Control Hydraulic Installations.* (C. G. Hebel, Aero Digest, Vol. 41, No. 6, Dec., 1942, pp. 228-233.)
271	8276	U.S.A. ...	*Regulations for Aircraft Electrical Installations* (*Part II*). (Aero Digest, Vol. 41, No. 6, Dec., 1942, pp. 238-246 and 293-294.)
272	8401	G.B.	*The "Bristol" Hydraulic System.* (Engineer, Vol. 175, No. 4,549, 19/3/43, pp. 237-239.)
273	8409	G.B.	*The "Bristol" Hydraulic System for Aeroplanes.* (Engineering, Vol. 155, No. 4,027, 19/3/43, pp. 225-227.)
274	8417	U.S.A. ...	*Design Considerations for Long-Range Heavy Cargo Carrying Transport.* (W. R. Lewis, Aero Digest, Vol. 42, No. 1, Jan., 1943, pp. 92-94 and 246-251.)
275	8423	U.S.A. ...	*Moulded Shell Construction in Plywood.* (A. Klemin, Aero Digest, Vol. 42, No. 1, Jan., 1943, pp. 148, 158 and 256.)
276	8432	U.S.A. ...	*Design Considerations of Aircraft Electrical Systems.* (T. B. Holiday, Aero Digest, Vol. 42, No. 1, Jan., 1943, pp. 205-210.)
277	8447	U.S.A. ...	*Flushing Tail Lights for Transport Aircraft.* (Aero Digest, Vol. 42, No. 1, Jan., 1943, p. 350.)

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278	8510	U.S.A. ...	*Rubber Wind Sock for Trailing Aircraft Antennæ.* (Aviation, Vol. 41, No. 5, May, 1942, p. 177.)
279	8549	U.S.A. ...	*"Non-Critical" Materials Used in Airframe Construction (Plywood, Plastics, Mg., etc.).* (Sci. Am., Vol. 168, No. 1, Jan., 1943, pp. 40-41.)
280	8643	G.B.	*Moulded Plastic Plywood Aircraft Construction.* (J. S. Trevor, Aeronautics, Vol. 7, No. 4, Nov., 1942, pp. 40-41.)
281	8675	G.B.	*Uses of Magnesium in Aircraft Construction.* (Aeroplane, Vol. 64, No. 1,660, 19/3/43, p. 321.)
282	8697	G.B.	*The Bristol Hydraulic System.* (Aeroplane, Vol. 64, No. 1,661, 26/3/43, pp. 355-357.)
283	8712	G.B.	*Rotating Wing Aircraft (Historical Development).* (Flight, Vol. 43, No. 1,787, 25/3/43, pp. 305-309.)
284	8722	G.B.	*Bristol Hydraulic System.* (Flight, Vol. 43, No. 1,787, 25/3/43, pp. 314-317.)
285	8731	U.S.A. ...	*The Future of Water Based Aeroplanes.* (F. T. Courtney, Aviation, Vol. 41, No. 10, Oct., 1942, pp. 122-123, 314, 317-322.)
286	8736	U.S.A. ...	*Tail Light Flasher.* (Aviation, Vol. 41, No. 10, Oct., 1942, p. 172.)
287	8763	Germany ...	*The Selection of Suitable Material in Engineering Design.* (E. Eichwald, A.T.Z., Vol. 45, No. 24, 25/12/42, pp. 657-663.)
288	8790	G.B.	*R.A.F. Aircraft, 1918-1943.* (Flight, Vol. 63, No. 1,788, 1/4/43, pp. 329-336 and 342.)
289	8794	G.B.	*Structure of the R.A.F. from 1918 to 1943.* (F. A. dV. Robertson, Flight, Vol. 63, No. 1,788, 1/4/43, pp. 343-348.)
290	8800	G.B.	*Wing Tips (Round versus Square).* (W. E. Hick, Aeronautics, Vol. 8, No. 1, Feb., 1943, pp. 42-46.)
291	8801	G.B.	*Schilovsky Non-Rubber Resilient Wheels (Spring Spokes).* (Aeronautics, Vol. 8, No. 1, Feb., 1943, p. 46.)
292	8850	Germany ...	*Metal Shell Structures for Fuselages. (Pat. serics 48, No. 699,064.)* (Messerschmitt, Flugsport, Vol. 35, No. 4, 17/2/43, p. 197.)
293	8851	Germany ...	*Wooden Shell Structures for Aircraft. (Pat. serics 48, No. 720,100.)* (Klemm, Flugsport, Vol. 35, No. 4, 17/2/43, p. 197.)
294	8854	Germany ...	*Test Gear for Checking Profile of Aircraft Control Surfaces.* (Fieseler, Flugsport, Vol. 35, No. 4, 17/2/43, p. 198.)
295	8858	Switzerland ...	*Tricycle Landing Gears.* (Inter. Avia., No. 854-855, 3/2/43, pp. 1-5.)
296	8898	Germany ...	*Tailless Aircraft Models.* (Flugsport, Vol. 35, No. 6, 17/3/43, pp. 74-75.)
			Performance and Testing.
297	8235	Germany ...	*Record Performance of D30 Sailplane (Gliding Angle 1.37, Rate of Descent 58 cm./sec., Weight 306 kg.).* (Flugsport, Vol. 35, No. 5, 3/3/43, p. 61.)

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298	8733	U.S.A.	...	*Stratospheric Testing of Aircraft Parts.* (D. Tenney, Aviation, Vol. 41, No. 10, Oct., 1942, pp. 137 and 289-292.)
299	8788	G.B. ...	...	*High Altitude Flight—Part III.* (W. Nichols, Flight, Vol. 43, No. 1,784, 4/3/43, pp. 236-239.)
300	8849	Germany	...	*Rules for Model Aircraft Competition (no Airscrew).* (Flugsport, Vol. 35, No. 4, 17/2/43, p. 51.)
				Civil Aviation and Air Cargo.
301	8220	Switzerland	...	*Post War Problems of International Air Services.* (Inter. Avia., No. 851, 12/1/43, pp. 1-4.)
302	8279	U.S.A.	...	*Scientific Cargo Loading.* (E. S. Evans, Aero Digest, Vol. 41, No. 6, Dec., 1942, pp. 257-258 and 280.)
303	8560	Sweden	...	*Swedish Civil Aviation Plans for After the War.* (Engineer, Vol. 175, No. 4,550, 26/3/43, p. 260.)
304	8629	U.S.A.	...	*Commercial Air Transport and Post War Air Routes.* (Aeroplane, Vol. 64, No. 1,651, 15/1/43, p. 80.)
305	8685	G.B. ...	...	*The Future of European Air Transport.* (Aeroplane, Vol. 64, No. 1,660, 19/3/43, p. 340.)
306	8739	U.S.A.	...	*Estimation of Future Passenger Air Traffic.* (E. A. Van Deusen, Aviation, Vol. 41, No. 10, Oct., 1942, pp. 215-218 and 282-285.)
307	8751	U.S.A.	...	*American Air Transport Prospects.* (C. J. Stanton, Vol. 64, No. 1,659, 12/3/43, pp. 302-303.)
308	8777	G.B. ...	...	*The Future of Air Commerce.* (R. H. Thornton, Flight, Vol. 43, No. 1,784, 4/3/43, pp. 226-228.)
				Airscrews and Helicopters.
309	8168	G.B. ...	...	*Hydulignum Airscrews.* (Inter. Avia., No. 847, 10/12/42, p. 11.)
310	8202	U.S.A.	...	*The Performance of a Vaneless Diffuser Fan.* (V. Polikovsky, M. Nevelson, C.A.H.I. Report, No. 224, Moscow, 1935.) (R.T.P. Translation No. T.M. 1,038.) (N.A.C.A. Tech. Memo. No. 1,038, Dec., 1932.)
311	8209	Switzerland	...	*Escher-Wyss Variable Pitch Airscrew Adapted for Braking and Landing Speeds.* (Inter. Avia., No. 848-849, 21/12/42, pp. 11-12.)
312	8237	Germany	...	*Helicopter Drive, Rotation being Maintained by Induced Blade Variations.* (*Pat. series* 49, *No.* 729,819.) (A.V.A., Flugsport, Vol. 35, No. 5, 3/3/43, pp. 201-202.)
313	8286	Germany	...	*Blade Root Bearing for V.P. Airscrews.* (*Pat. series* 47, *No.* 727,968.) (Junkers, Flugsport, Vol. 38, No. 3, 3/2/43, p. 189.)
314	8287	Germany	...	*Constant Speed Control for V.P. Airscrews.* (*Pat. series* 47, *No.* 729,706.) (Junkers, Flugsport, Vol. 35, No. 3, 3/2/43, pp. 189-190.)
315	8288	Germany	...	*Reversible Hydraulic Control for V.P. Airscrews.* (*Pat. series* 47, *No.* 727,908.) (Junkers, Flugsport, Vol. 35, No. 3, 3/2/43, p. 190.)

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316	8289	Germany ..	*Hydraulic Control for V.P. Airscrews.* (*Pat. series* 47, *No.* 728,851.) (Junkers, Flugsport, Vol. 35, No. 3, 3/2/43, p. 190.)
317	8290	Germany ..	*Contra Propeller Drive.* (*Pat. series* 47, *No.* 727,658.) (Barbaron, Flugsport, Vol. 35, No. 3, 3/2/43, pp. 190-191.)
318	8399	U.S.A. ...	*The Vought-Sikorsky Helicopter.* (Engineer, Vol. 175, No. 4,549, 19/3/43, p. 230.)
319	8506	U.S.A. ...	*Dynamic Balancing of Propellers.* (E. Kronauer, Aviation, Vol. 41, No. 5, May, 1942, pp. 119-121, 244.)
320	8667	G.B.	*Hydulignum Airscrew.* (Hordern, Richmond Aircraft Co., Ltd., Machinist, Vol. 86, No. 83, 28/11/42, pp. 211-212.)
321	8910	France ...	*Gnome Rhone Variable Pitch Airscrew (Controlled and Automatic Type).* (Plein Ciel, No. 52, 1936, pp. 33-36.)
			Patents
322	8238	Germany ...	*Landing Wheel with Emergency Running Surface (in Case of Tyre Failure).* (*Pat. series* 49, *No.* 729,819.) (Messerschmitt, Flugsport, Vol. 35, No. 5, 3/3/43, p. 203.)
323	8239	Germany ...	*Aircraft Shock Absorber.* (*Pat. series* 49, *No.* 728,207.) (Focke-Wulf, Flugsport, Vol. 35, No. 5, 3/3/43, p. 203.)
324	8240	Germany ...	*Twin Wheel Landing Gear.* (*Pat. series* 49, *No.* 728,620.) (V.D.M., Flugsport, Vol. 35, No. 5, 3/3/43, p. 203.)
325	8242	Germany ..	*Tricycle Undercarriage with Adjustable Castoring Angle of Rear Wheels.* (*Pat. series* 49, *No.* 726,614.) (Heinkel, Flugsport, Vol. 35, No. 5, 3/3/43, p. 204.)
326	8243	Germany ...	*Retractable Undercarriage (Wheel Retracts into Fuselage).* (*Pat. series* 49, *No.* 726,651.) (Heinkel, Flugsport, Vol. 35, No. 5, 3/3/43, pp. 204-205.)
327	8244	Germany ...	*Retractable Undercarriage.* (*Pat. series* 49, *No.* 727,421.) (Elektron, Flugsport, Vol. 35, No. 5, 3/3/43, p. 205.)
328	8245	Germany ..	*Retractable Undercarriage.* (*Pat. series* 49, *No.* 729,167.) (Henschel, Flugsport, Vol. 35, No. 5, 3/3/43, p. 206.)
329	8247	Germany ..	*Cover Plates for the Retractable Undercarriage Recess.* (*Pat. series* 49, *No.* 729,222.) (Fieseler, Flugsport, Vol. 35, No. 5, 3/3/43, p. 206.)
330	8248	G.B.	*Cover Plates for Retractable Undercarriage Recess.* (*Pat. series* 49, *No.* 729,820.) (Messerschmitt, Flugsport, Vol. 35, No. 5, 3/3/43, p. 207.)
331	8249	Germany ..	*Sea Rudder for Floats.* (*Pat. series* 49, *No.* 726,615.) (Focke-Wulf, Flugsport, Vol. 35, No. 5, 3/3/43, pp. 207-208.)
332	8250	Germany ..	*Emergency Flotation Gear for Land Planes.* (*Pat. series* 49, *No.* 729,459.) (Arado, Flugsport, Vol. 35, No. 5, 3/3/43, p. 208.)

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333	8251	Germany .	*Underwater Wings for Assisted Take-off (Avoidance of Cavitation).* (*Pat. series* 49, *No.* 726,616.) (Heinkel, Flugsport, Vol. 35, No. 5, 3/3/43, p. 208.)
334	8291	Germany . .	*Filling Device for Balance Tanks in Hydraulic System.* (*Pat. series* 47, *No.* 728,604.) (Henschel, Flugsport, Vol. 35, No. 3, 3/2/43, p. 191.)
335	8296	Germany ...	*Retractable Aircraft Searchlight.* (*Pat. series* 47, *No.* 728,024.) (Zeiss, Flugsport, Vol. 35, No. 3, 3/2/43, pp. 194-195.)
336	8299	Germany . .	*Jettisoning Device for Aircraft Equipment (Especially Cameras).* (*Pat. series* 47, *No.* 725,914.) (Henschel, Flugsport, Vol. 35, No. 3, 3/2/43, p. 195.)
337	8300	Germany ...	*Optical Device for Reading Aircraft Instruments Outside the Normal Field of Vision.* (*Pat. series* 47, *No.* 725,915.) (Henschel, Flugsport, Vol. 35, No. 3, 3/2/43, pp. 195-196.)
338	8301	Germany . .	*Projection of Aircraft Instrument Readings on to the Wind Screen.* (*Pat. series* 47.) (Arado, Flugsport, Vol. 35, No. 3, 3/2/43, p. 196.)
339	8840	Germany .	*Continued Servo Rudder and Trimming Tab Operations.* (*Pat. series* 48, *No.* 728,315.) (Focke-Wulf, Flugsport, Vol. 35, No. 4, 17/2/43, p. 199.)
340	8841	Germany .	*Interconnection of Control Surface Lock and Engine Throttle.* (*Pat. series* 48, *No.* 729,818.) (Fieseler, Flugsport, Vol. 35, No. 4, 17/2/43, p. 199.)
341	8842	Germany ..	*Elastic Foot Rest for Rudder Bars.* (*Pat. series* 48, *No.* 729,457.) (Fieseler, Flugsport, Vol. 35, No. 4, 17/2/43, p. 199.)
342	8843	Germany . .	*Device for Operating Several Control Surfaces in Succession.* (*Pat. series* 48, *No.* 729,818.) (Messerschmitt, Flugsport, Vol. 35, No. 4, 17/2/43, p. 200.)
343	8246	Germany ...	*Locking Device for Servo Motor Pistons.* (*Pat. series* 49, *No.* 729,168.) (Teves, Flugsport, Vol. 35, No. 5, 3/3/43, p. 206.)
344	8852	Germany ...	*Modified Fowler Flap.* (*Pat. series* 48, *No.* 729,783.) (Focke-Wulf, Flugsport, Vol. 35, No. 4, 17/2/43, p. 197.)
345	8853	Germany ..	*Wing or Control Surface Construction.* (*Pat. series* 48, *No.* 728,721.) (Messerschmitt, Flugsport, Vol. 35, No. 4, 17/2/43, pp. 197-198.)
346	8856	Germany ..	*Aircraft Wing with Controlled Projecting Nose.* (*Pat. series* 48, *No.* 729,456.) (Arado, Flugsport, Vol. 35, No. 4, 17/2/43, p. 198.)
347	8857	Germany ...	*Automatic Pilot.* (*Pat. series* 48, *No.* 729,784.) (Askania, Flugsport, Vol. 35, No. 4, 17/2/43, pp. 198-199.)
348	8899	Germany ...	*Aircraft Braking by Means of Propeller (Interconnection of Throttle and Wheel Brakes).* (*Pat. series No.* 1, 1943, *No.* 724,197.) (Messerschmitt, Flugsport, Vol. 35, No. 6, 17/3/43, p. 1.)

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349	8900	Germany ..	*Aircraft Wheel Brakes.* (*Pat. series No.* 1, 1943, *No.* 726,327.) (Argus, Flugsport, Vol. 35, No. 6, 17/3/43, p. 1.)
350	8901	Germany ...	*Electrically Operated Wheel Brakes* (*Automatic Circuit Brake Operates during Retraction*). (*Pat. series No.* 1, 1943, *No.* 729,376.) (Elektron, Flugsport, Vol. 35, No. 6, 17/3/43, p. 2.)
351	8902	Germany ...	*Aerodynamic Brake for Multi-Engined Aircraft* (*Rear of Engine Nacelle Opens Out*). (*Pat. series No.* 1, 1943, *No.* 723,604.) (Dornier, Flugsport, Vol. 35, No. 6, 17/3/43, p. 2.)
352	8903	Germany ...	*Balanced Diving Brake Assembly* (*Above and Below Wing Surface*). (*Pat. series No.* 1, 1943, *No.* 726,413.) (D.F.S.F., Flugsport, Vol. 35, No. 6, 17/3/43, p. 2.)
353	8904	Germany ...	*Earth Anchor for Aircraft.* (*Pat. series No.* 1, 1943, *No.* 726,759.) (Weser, Flugsport, Vol. 35, No. 6, 17/3/43, p. 2.)
354	8905	Germany ...	*High Speed Rail Car for Measuring Aerodynamic Force of Aircraft.* (*Pat. series No.* 1, 1943, *No.* 724,363.) (Bossig, Flugsport, Vol. 35, No. 6, 17/3/43, pp. 2-3.)
355	8906	Germany ...	*Pneumatic Relay for Pilotless Wireless Controlled Aircraft.* (*Pat. series No.* 1, 1943, *No.* 725,771.) (Askania, Flugsport, Vol. 35, No. 6, 17/3/43, p. 3.)
356	8907	Germany ...	*Wireless Control for Aircraft Models* (*Free Flight within a Certain Zone*). (*Pat. series No.* 1, 1943, *No.* 728,025.) (Argus, Flugsport, Vol. 35, No. 6, 17/3/43, pp. 3-4.)
357	8908	Germany ...	*Barrage Balloon Cable Deflector.* (*Pat. series No.* 1, 1943, *No.* 728,852.) (Junkers, Flugsport, Vol. 35, No. 6, 17/3/43, p. 4.)
			De-Icing.
358	8252	Germany ...	*Wing De-Icing by Electrolysis.* (*Pat. series* 49, *No.* 728,047.) (Dornier, Flugsport, Vol. 35, No. 3, 3/3/43, p. 208.)
359	8418	Canada ...	*Ice on Aircraft* (*Bibliography*). (Nat. Research Council, No. 1,033, Dec., 1941.)
360	8734	U.S.A. ...	*New Electric Ice Indicator.* (Aviation, Vol. 41, No. 10, Oct., 1942, pp. 138-143.)
			Airfield Equipment and Maintenance.
361	8281	U.S.A. ...	*Air Port Snow Removal.* (W. M. Fletcher, Aero Digest, Vol. 41, No. 6, Dec., 1942, pp. 85-88 and 290-292.)
362	8295	Germany ...	*Oil Smoke Wind Indicator for Aerodromes.* (*Pat. series* 47, *No.* 728,095.) (Pintsch, Flugsport, Vol. 35, No. 3, 3/2/43, pp. 194-195.)
363	8297	Germany ...	*Automatic Landing Direction Indicator for Aerodromes.* (*Pat. series* 47, *No.* 728,094.) (Pintsch, Flugsport, Vol. 35, No. 3, 3/2/43, p. 195.)

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364	8298	Germany ...	*Landing Lights for Aerodromes.* (*Pat. series* 47, *No.* 728,095.) (Pintsch, Flugsport, Vol. 35, No. 3, 3/2/43, p. 195.)
365	8414	G.B.	*Catapult Spool.* (*Patent* 458,571.) (Blackburn Aircraft, Ltd., Engineering, Vol. 155, No. 4,027, 19/3/43, p. 240.)
366	8613	U.S.A. ...	*Auto Transformer Controls Brightness of Airport Lights.* (Am. Av., Vol. 222, No. 10, 15/10/42, p. 35.)
367	8615	U.S.A. ...	*Wind Direction Indicator.* (Am. Av., Vol. 222, No. 10, 15/10/42, p. 35.)
368	8637	U.S.A. ...	*Aerial View of "First Flight Strip"* (*Photo*). (U.S. Air Services, Vol. 27, No. 8, Aug., 1942, p. 36.)
369	8708	G.B.	*Portable Tarmac.* (Aeroplane, Vol. 64, No. 1,661, 26/3/43, p. 368.)
370	8747	G.B.	*Saving Undercarriage Tyres* (*Description of Correct Treatment and Handling*). (Aeroplane, Vol. 64, No. 1,659, 12/3/43, p. 300.)
371	8822	G.B.	*Aerodrome Abstracts, No.* 23-41. *Road Research Lab., Compiled by D.S.I.R.* (Vol. II, No. 2, 1943.)

Engines and Accessories.

Named Types.

372	8166	G.B.	*Napier "Sabre" Engine.* (Inter. Avia., No. 847, 10/12/42, p. 9.)
373	8213	U.S.A. ...	*Wright Duplex "Cyclone"* (2,000 *h.p.*). (Inter. Avia., No. 848-849, 21/12/42, pp. 16-17.)
374	8306	U.S.A. ...	*Guiberson Diesels for Tanks.* (Inter. Avia., No. 846, 30/11/42, pp. 1 and 8.)
375	8438	U.S.A. ...	*The* 300 *h.p. Gypsy Six Aero Engine.* (Aero Digest, Vol. 42, No. 1, Jan., 1943, p. 242.)
376	8592	G.B.	*The Erren Engine.* (Sci. Lib., Bibliog. Series, No. 584.)
377	8630	G.B.	*Gipsy Major I Aero Engine's Reliability.* (Aeroplane, Vol. 64, No. 1,651, 15/1/43, p. 82.)
378	8881	France ..	*Gnome Rhone Engines,* 14 *R.,* 18 *R., Double* 14 *R.* (28-*Cylinder,* 3,200 *h.p.*), 14 *Mars S.*). (Inter. Avia., No. 852-853, 25/1/43, pp. 15-16.)
379	8883	G.B.	*Rolls Royce Merlin* 61. (Inter. Avia., No. 852-853, 25/1/43, pp. 1 and 7-8.)

Design and Progress.

380	8254	G.B.	*Technical Abstracts issued by the Aero Engine Dept., The Bristol Aeroplane Co., Ltd.* (Vol. VIII, No. 10, March 11th, 1943.)
381	8579	G.B.	*Compression Ignition Engines* (256 *Abstracts*). (I.A.E. Report, No. 1,941-1,942, December, 1941.)
382	8583	G.B.	*Technical Abstracts issued by Aero Engine Dept., Bristol Aeroplane Co.* (Vol. 8, No. 12, 25/3/43.)
383	8793	G.B.	*Engine Progress,* 1918-1943. (G. Geoffrey Smith, Flight, Vol. 63, No. 1,788, 1/4/43, pp. 337-342.)

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384	8818	G.B. ...	*Technical Abstracts (issued by the Aero Engine Dept., Bristol Aeroplane Co., Ltd.).* (Vol. 8, No. 9, March 4th, 1943.)
385	8825	G.B. ...	*Technical Abstracts issued by the Aero Engine Dept., The Bristol Aeroplane Co., Ltd.* (Vol. 8, No. 11, March 18th, 1943.)
			Installation.
386	8267	U.S.A.	*Engine Mount Resonance.* (Aero Digest, Vol. 41, No. 6, Dec., 1942, pp. 152-271.)
			Testing and Maintenance.
387	8181	Germany	*Mixture Distribution and Fuel Volatility in Multi-Cylinder Engines (with Some Notes on the Advantages of Fuel Injection).* (F. Penzig, Z.V.D.I., Vol. 85, No. 11, 15/3/41, pp. 273-274.)
388	8255	U.S.A.	*American Bosch Induction Vibrator for Engine Starting (Advert.).* (Aero Digest, Vol. 41, No. 6, Dec., 1942, p. 97.)
389	8442	U.S.A.	*Preventing Idling Failures in Flight on Four-Cylinder Engines.* (Aero Digest, Vol. 42, No. 1, Jan., 1943, pp. 323-324.)
390	8547	U.S.A.	*Sound-Proofing in Engine Testing Laboratories (Fibre Glass).* (Sci. Am., Vol. 168, No. 1, Jan., 1943, p. 41.)
391	8644	G.B.	*Combustion Chamber Phenomena.* (E. A. Smith, Aeronautics, Vol. 7, No. 4, Nov., 1942, pp. 42-45.)
392	8721	G.B. ...	*Warming Up the Engine.* (Flight, Vol. 43, No. 1,787, 25/3/43, p. 311.)
393	8738	U.S.A.	*Location of Ignition Troubles.* (H. N. Walker, Aviation, Vol. 41, No. 10, Oct., 1942, pp. 211, 300-304.)
394	8761	Germany	*Operating Diesel Engine on Coal Gas with Spark Ignition.* (E. Raentsch, A.T.Z., Vol. 46, No. 1, 10/1/43, pp. 16-17.)
			Gas Turbines and Engines.
395	8559	G.B. ...	*Position and Development of the Gas Engine.* (J. Jones, Engineer, Vol. 175, No. 4,550, 26/3/43, pp. 256-258.)
396	8863	G.B. ...	*The Position and Development of the Gas Engine.* (J. Jones, Engineer, Vol. 175, No. 4,551, 2/4/43, pp. 276-277.)
397	8929	Switzerland	*Brown Boveri Gas Turbine.* (Machinery, Vol. 62, No. 1,583, 11/2/43, p. 150.)
398	8963	G.B.	*Position and Development of the Gas Engine (Discussion).* (J. Jones, Engineering, Vol. 153, No. 4,029, 2/4/43, pp. 263-264.)
			Oil Engines, Boilers and Pumps.
399	8223	G.B.	*Development of Doxford Marine Oil Engine.* (W. Ker Wilson, Engineering, Vol. 155, No. 4,025, 5/3/43, pp. 181-182.)
400	8268	U.S.A.	*Performance of Pressure Loaded Gear Pumps.* (J. M. Roth, Aero Digest, Vol. 41, No. 6, Dec., 1942, pp. 160-162.)

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401	8344	G.B. ...	*The Development of the Doxford Marine Oil Engine.* (W. Ker Wilson, Engineering, Vol. 155, No. 4,026, 12/3/43, pp. 201-202.)
402	8406	G.B.	*The Heat Pump.* (T. F. Wall, Engineering, Vol. 155, No. 4,027, 19/2/43, p. 221.)
403	8410	G.B. ...	*Portable Vertical Oil Fired Boiler.* (Engineering, Vol. 155, No. 4,027, 19/3/43, p. 235.)
			Gears, Spark Plugs.
404	8441	Switzerland ...	*Spark Plugs for Aviation Engines.* (Trade Booklet issued by the firm P. E. M. Delemont, Switzerland, 1942.)
405	8572	G.B.	*Piston Ring and Cylinder Wear in Automobile Type Engines (an Examination of Available Literature).* (P. V. Lamarque, I.A.E. Report, No. 1,942-10, 23/9/42.)
406	8581	G.B. ...	*Gears (Collection of Abstracts).* (I.A.E. Report, No. 1,942-1,949.)
407	8582	G.B. ...	*Durability of Gears.* (H. D. Mansion, I.A.E. Report, No. 1,942-12, Dec., 1942.)
408	8930	G.B.	*Aero Engine Gearing.* (P. B. Brown and E. V. Farrar, Machinery, Vol. 62, No. 1,583, 11/2/43, pp. 157-158.)
			Cooling System.
409	8308	U.S.A. ...	*Air-Cooling by Ducts.* (*Fairchild Engine Patent No. 2,280,957.*) (Inter. Avia., No. 846, 30/11/42, p. 9.)
410	8540	U.S.A. ...	*New Anti-Freeze for Engine Cooling System.* (Sci. Am., Vol. 168, No. 1, Jan., 1943, p. 26.)
			Fuels and Lubricants.
			General.
411	8159	France ...	*New Pipe Line in France.* (Petroleum Times, Vol. 47, No. 1,187, 23/1/43, p. 30.)
412	8163	France	*France's Difficulty in Finding Petroleum Substitutes.* (Petroleum Times, Vol. 47, No. 1,187, 23/1/43, p. 38.)
413	8396	U.S.A. ...	*Petroleum Shortage in U.S.A.* (B. T. Brooks and L. O. Snider, Ind. and Eng. Chem., Vol. 21, No. 2, 25/1/43, pp. 69-72.)
414	8595	G.B. ...	*Summary of Work for Three Weeks ending 20th and 27th February and 6th March.* (Issued by the Fuel Research Intelligence Section.)
415	8821	G.B. ...	*Fuel Research Intelligence Section, Fuel Research Station, E. Greenwich, S.E.10.* (Summary for Two Weeks ending 6th and 13th February, 1943.)
			High Octane Fuel.
416	8459	U.S.A.	*New Catalytic Process for Producing Increase in High Octane Aviation Fuel.* (Ind. and Eng. Chem., Vol. 21, No. 3, 20/2/43, p. 186.)
			Gaseous Fuels.
417	8157	U.S.S.R. ...	*Producer-Gas Developments in Russia.* (Petroleum Times, Vol. 47, No. 1,187, 23/1/43, p. 29.)

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418	8158	Germany ...	*New Generator Fuel in Germany.* (Petroleum Times, No. 47, No. 1,187, 23/1/43, p. 29.)
419	8162	U.S.A. ..	*Wartime Development of U.S. Helium Resources.* (Petroleum Times, Vol. 47, No. 1,187, 23/1/43, p. 37.)
420	8165	Eire	*Producer-Gas Developments in Eire.* (Petroleum Times, Vol. 47, No. 1,187, 23/1/43, pp. 30 and 48.)
421	8359	U.S.A. ..	*Pure Hydrocarbons from Petroleum.* (J. Griswold and E. E. Ludwig, Ind. and Eng. Chem. (Ind. Ed.), Vol. 35, No. 1, Jan., 1943, pp. 117-119.)
422	8402	Italy	*Methane as Locomotive Fuel in Italy.* (Engineer, Vol. 175, No. 4,549, 19/3/43, p. 239.)
423	8451	U.S.A. ...	*Liquefied Petroleum Gas in* 1942. (Ind. and Eng. Chem., Vol. 21, No. 3, 20/2/43, pp. 188-189.)
424	8760	Germany ...	*New Types of Wood Gas Generators.* (A.T.Z., Vol. 46, No. 1, 10/1/43, pp. 15-16.)
425	8768	Germany ..	*Operation of Motor Buses with Coal Gas (Uncompressed).* (A.T.Z., Vol. 45, No. 24, 25/12/42, p. 672.)
			Lubricating Oils.
426	8390	Brazil ...	*Vegetable Instead of Mineral Oils for Diesel Motors.* (Ind. and Eng. Chem., Vol. 21, No. 2, 25/1/43, p. 95.)
427	8393	U.S.A. .	*Isoversion Process of Oil Refining (Catalytic).* (Ind. and Eng. Chem., Vol. 21, No. 2, 25/1/43, p. 108.)
428	8576	G.B.	*Aeration and Frothing of Lubricants (Tests on a Centrifugal De-Aerator).* (H. R. Mills, I.A.E. Report, No. 1,941-1,946, June, 1941.)
429	8577	G.B.	*Oil Cleaning and Deterioration of Lubricants in Service (88 Abstracts).* (I.A.E. Report, No. 1,941-1,947, July, 1941.)
430	8591	G.B.	*Reclaiming Used Lubricating Oil* (1930-1942). (Sci. Lib., Bibliog. Series, No. 583.)
431	8597	G.B.	*Quarterly Bibliography of Lubrication, No. 38, April-June,* 1942. (Science Lib., Bibliog. Series, No. 2.)
432	8606	U.S.A. ...	*Analysis of Used Lubricating Oil (Discussion).* (L. L. Davis, A.S.T.M. Bulletin, No. 119, Dec., 1942, pp. 17-19.)
433	8759	Germany ..	*The Lubrication of Gears with Special Reference to Condition of Boundary Lubrication.* (A.T.Z., Vol. 46, No. 1, 10/1/43, p. 12.)
			Petrol Cans, Fuel Flow Meter.
434	8164	G.B.	*British Petrol Cans Under Criticism.* (Petroleum Times, Vol. 47, No. 1,187, 23/1/43, p. 48.)
435	8767	Germany ..	*Fully Automatic Fuel Flow Meter (Calibrated Tank Type).* (V. Schmidt, A.T.Z., Vol. 45, No. 24, 25/12/42, pp. 670-672.)
			Theory of Elasticity.
436	8155	G.B.	*Stress-Strain Relations in Timber Beams (Douglas Fir).* (A. G. H. Dietz, A.S.T.M. Bulletin, No. 118, Oct., 1942, pp. 19-27.)

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440	8191	U.S.A. ...	*Materials and Devices of Falling Resistance-Temperature Characteristic.* (R. W. Sillars, J. Sci. Instruments, Vol. 19, No. 6, June, 1942, pp. 81-84.)
442	8193	Germany ..	*Comparative Investigations on the Torsional Stiffness of an Automobile Engine Crankshaft.* (K. Haugh, A.T.Z., Vol. 43, No. 16, 25/8/40, pp. 493-502.)
443	8194	Germany ..	*Stress Determination of Crankshaft in the Critical Region Taking Damping into Account.* (J. Geiger, A.T.Z., Vol. 43, No. 16, 25/8/40, pp. 403-406.)
444	8197	G.B.	*Classification of Rheological Properties of Industrial Materials in the Light of Power-Law Relations between Stress, Strain and Time.* (O. W. Scott Blair, J. Sci. Instruments, Vol. 19, No. 6, June, 1942.)
445	8285	Germany .	*Buckling Stresses for Cr.-Mo. 60 Steel Tubing (including Dimensions and Weight for a Given Load and Span).* (Flugsport, Vol. 35, No. 3, 3/2/43, pp. 36 a-b.)
446	8370	G.B.	*Force Required to Pull Out Metal Inserts Moulded in Various Moulding Compositions.* (A. Friedman and M. Cooke-Dallin, British Plastics, Vol. 14, No. 166, March, 1943, pp. 616 and 626.)
447	8407	G.B.	*The Problem of Combined Stress.* (J. J. Guest, Engineering, Vol. 155, No. 4,027, 19/3/43, p. 222.)
448	8488	G.B.	*Resilience of Beams and Springs.* (L. P. Dudley, Light Metals, Vol. 6, No. 61, Feb., 1943, pp. 80-86.)
449	8505	U.S.A. ..	*Strength Analysis of Riveted and Bolted Joints.* (W. A. McGowan, Aviation, Vol. 41, No. 5, May, 1942, pp. 105-112.)
450	8556	G.B.	*Approximate Theory of the Displacements Produced in Encastré Beams Due to Elasticity of the Supports.* (S. T. Newing, Phil. Mag., Vol. 34, No. 230, March, 1943, pp. 162-182.)
451	8565	G.B.	*Extreme Properties of Matter.* (C. G. Darwin, J. Inst. Civ. Engs., Vol. 19, No. 4, Feb., 1943, pp. 207-223.)
452	8569	G.B.	*Determination of the Buckling Loads of Struts with Successive Approximations.* (J. Ratzersdorfer, J. Roy. Aeron. Soc., Vol. 47, No. 387, March, 1943, pp. 103-105.)
453	8956	G.B.	*Swelling in Relation to Permeability of Organic Membrane.* (B. J. Brajnikoff, Plastics, Vol. 7, No. 71, April, 1943, pp. 173-184.)
			Materials.
			A. Properties.
			Iron and Steel.
454	8325	G.B.	*Calibration of Thermo-Couples Over Liquid Steel Temperature Range.* (C. R. Barber, Engineering, Vol. 155, No. 4,025, 5/3/43, p. 187.)

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455	8345	G.B.	*Calibration of Thermo-Couple Over the Liquid Steel Temperature Range.* (C. R. Barber, Engineering, Vol. 155, No. 4,026, 12/3/43, p. 205.)
456	8347	G.B.	*Boron as a Steel Alloying Element.* (Engineering, Vol. 155, No. 4,026, 12/3/43, p. 210.)
457	8468	G.B.	*Examination of Sheet Metal of a Focke-Wulf 190 Recently Captured.* (A. McLeod, Sheet Metal Industries, Vol. 16, No. 187, Nov., 1942, pp. 1,721-1,723.)
458	8535	U.S.A. ...	*Chromium Steels for Boiler Plants.* (Sci. Am., Vol. 168, No. 1, Jan., 1943, p. 10.)
459	8553	G.B.	*Recovery of Gilding Metal from Clad Steel.* (Metal Ind., Vol. 62, No. 13, 26/3/43, p. 201.)
460	8586	G.B.	*High Speed Steel (1935 to date).* (Sci. Lib., Bibliog. Series, No. 578.)
			Al. and Mg. Alloys.
461	8314	U.S.A. ..	*Magnesium Production in the U.S.A.* (Inter. Avia., No. 846, 30/11/42, pp. 11-12.)
462	8490	G.B.	*Mechanical Properties of Cu.-Mg.-Al. Alloys.* (Light Metals, Vol. 6, No. 61, Feb., 1943, pp. 101-104.)
463	8550	G.B.	*Aluminium and its Alloys in Marine Construction.* (C. O. Taylor, Metal Ind., Vol. 62, No. 13, 26/3/43, pp. 194-196.)
464	8555	G.B.	*The Hall Effect and Some Other Physical Constants of Alloys (Al. Silver Series, III).* (Handel Powell and E. J. Evans, Phil. Mag., Vol. 34, No. 230, March, 1943, pp. 145-161.)
465	8765	Germany ..	*Reduction in the Number of Al. Alloy Specifications.* (A.T.Z., Vol. 45, No. 24, 25/12/42, pp. 667-668.)
466	8766	Germany ...	*Application of Supersonics in Metallurgy (Tinning of Al. and Preparation of Bronze-Graphite Mixtures).* (A.T.Z., Vol. 45, No. 24, 25/12/42, p. 668.)
467	8866	G.B.	*Al. and its Alloys in Marine Construction.* (G. O. Taylor, Metal Industry, Vol. 62, No. 14, 2/4/43, pp. 214-217.)
468	8964	G.B.	*Magnesium.* (C. H. Desch, Engineering, Vol. 153, No. 4,029, 2/4/43, pp. 265-266.)
			Non-Ferrous Alloys.
469	8200	G.B.	*A Heavy Duty Contact Material (Elkonite D. 56) (Silver Nickel).* (Mallory, Ltd., J. Scientific Instruments, Vol. 19, No. 6, June, 1942, p. 94.)
470	8387	U.S.A. ...	*Ductile Tungsten.* (L. A. Hawkins, Ind. and Eng. Chem., Vol. 21, No. 2, 25/1/43, pp. 89-90.)
471	8478	G.B.	*Fabrication of Beryllium-Copper Sheet and Strip.* (L. B. Hunt, Sheet Metal Industries, Vol. 16, No. 187, Nov., 1942, pp. 1,697-1,705.)
472	8563	G.B.	*Abstracts on Non-Ferrous Alloys.* (Nickel Bulletin, Vol. 15, No. 19, Oct., 1942.)
473	8605	U.S.A. ...	*Bibliography of Silicon Bronze.* (A.S.T.M. Bulletin, No. 119, Dec., 1942, pp. 31-35.)

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474	8713	Germany ..	*New German Alloy.* (Flight, Vol. 43, No. 1,787, 25/3/43, p. 310.)
475	8861	Germany ...	*Silver-Manganese Alloys for Electric Resistances.* (A. Schulze, Z. fur Instrum., Vol. 62, No. 9, Sept., 1942, pp. 302-303.)
476	8966	G.B.	*Copper Containing Se, Te and Bi.* (G. L. Bailey and A. P. C. Hallowes, Engineering, Vol. 153, No. 4,029, 2/4/43, p. 276.)
			Bearing Materials.
477	8762	Germany ...	*Systematic Tests on the Suitability of Bearing Materials.* (E. Heidbrock, A.T.Z., Vol. 45, No. 24, 25/12/42, pp. 652-656.)
478	8769	Germany ...	*Substitute Bearing Alloys in the U.S.A.* (A.T.Z., Vol. 45, No. 24, 25/12/42, pp. 665-667.)
			Plastics.
479	8278	U.S.A. ...	*Cementing Lucite.* (Aero Digest, Vol. 41, No. 6, Dec., 1942, p. 249.)
480	8312	U.S.A. ...	*Moulded Laminated Paper Plastic for Aircraft (McDonnel Aircraft).* (Inter. Avia., No. 846, 30/11/42, pp. 10-11.)
481	8334	G.B.	*"Bubblfil" Substitute for Kapok.* (Plastics, Vol. 7, No. 70, March, 1943, p. 96.)
482	8335	G.B.	*Plastic Film and Sheet for Small Coil Insulation.* (E. E. Halls, Plastics, Vol. 7, No. 70, March, 1943, pp. 109-121.)
483	8357	U.S.A. ...	*"Bubblfil" to Replace Kapok in Life Jackets, etc.* (Ind. and Eng. Chem. (Ind. Ed.), Vol. 35, No. 1, Jan., 1943, p. 10.)
484	8368	G.B.	*Transition Temperature and Cubic Expansion of Plastics Materials.* (F. E. Wiley, British Plastics, Vol. 14, No. 166, March, 1943, pp. 617-624.)
485	8372	G.B.	*Development of Cellulose Acetate Plastics.* (British Plastics, Vol. 14, No. 166, March, 1943, pp. 602-604.)
486	8373	G.B.	*New Uses for Plastics (Pump Handles, etc.).* (British Plastics, Vol. 14, No. 166, March, 1943, pp. 598-599.)
487	8375	G.B.	*Plastics Permanently Used for Aircraft Parts.* (British Plastics, Vol. 14, No. 166, March, 1943, pp. 595-596.)
488	8376	G.B.	*Tenite, Cellulose Plastic Used in the Manufacture of Nozzle Jets (Fire Fighting).* (British Plastics, Vol. 14, No. 166, March, 1943, p. 594.)
489	8377	G.B.	*Celluloid for Plastics Surgery.* (British Plastics, Vol. 14, No. 166, March, 1943, p. 593.)
490	8378	G.B.	*Plastics Dies Used in Aircraft Plants.* (British Plastics, Vol. 14, No. 166, March, 1943, p. 590.)
491	8379	G.B.	*Lumarith Transparent Aircraft Plastic Prevents Sunburn.* (British Plastics, Vol. 14, No. 166, March, 1943, p. 590.)
492	8384	U.S.A. ...	*Raw Materials for Plastics Manufacture.* (R. H. Ball, Ind. and Eng. Chem., Vol. 21, No. 2, 25/1/43, pp. 73-76.)

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493	8395	U.S.A. ...	*Nylon as a War Material.* (Ind. and Eng. Chem., Vol. 21, No. 2, 25/1/43, p. 121.)
494	8411	G.B.	*Applications of Plastic Materials.* (Engineering, Vol. 155, No. 4,027, 19/3/43, pp. 235-236.)
495	8448	U.S.A. ...	*Peace Time Values from a War Technology (Plastics, Rubber, Drugs, etc.).* (G. Egloff, Ind. and Eng. Chem., Vol. 21, No. 3, 20/2/43, pp. 141-149.)
496	8453	Germany ...	*Leather Substitutes in Germany.* (Ind. and Eng. Chem., Vol. 21, No. 3, 20/2/43, p. 165.)
497	8456	U.S.A. ...	*Laminated Plastics.* (Ind. and Eng. Chem., Vol. 21, No. 3, 20/2/43, pp. 176-177.)
498	8484	G.B.	*Some Recent Advances in Industrial Plastics.* (W. G. Wearmouth, J. Scientific Instruments, Vol. 19, No. 9, Sept., 1942, pp. 129-136.)
499	8495	G.B.	*Plastics in Radio Production.* (J. Inst. Elect. Eng., Vol. 9, Pt. 3, No. 9, March, 1943, p. 26.)
500	8502	U.S.A. ...	*Working Transparent Plastics for Aircraft Installations.* (J. Sasso, Aviation, Vol. 41, No. 5, May, 1942, pp. 86-95.)
501	8539	U.S.A. ...	*Scabbard for Bayonet Made of Plastic .* (Sci. Am., Vol. 168, No. 1, Jan., 1943, p. 26.)
502	8545	U.S.A. ...	*Plastic Wear-Resisting Mallet.* (Sci. Am., Vol. 168, No. 1, Jan., 1943, p. 39.)
503	8603	U.S.A. ...	*Acid and Alkali Resistance of Plastics.* (J. Delmonte, A.S.T.M. Bulletin, No. 119, Dec., 1942, pp. 11-15.)
504	8650	U.S.A. ...	*Lignin, Electrical Insulating Plastic.* (Rev. Scient. Insts., Vol. 14, No. 1, Jan., 1943, p. 26.)
505	8823	G.B.	*Plastics, Abstracts of Literature issued by Controller of Chemical Research.* (No. 42, Feb., 1943.)
506	8836	G.B.	*Resistoflex (Resilient Plastic).* (Machinist, Vol. 86, No. 42, 30/1/43, p. 1,154.)
507	8928	G.B.	*Thermo Plastic Replaces Iron Pipe.* (Machinery, Vol. 62, No. 1,583, 11/2/43, p. 149.)
508	8950	G.B.	*Plastics for Gears.* (D. W. Brown, Plastics, Vol. 7, No. 71, April, 1943, pp. 143-150.)
509	8951	G.B.	*Classification of Plastics.* (H. W. Stevens, Plastics, Vol. 7, No. 71, April, 1943, pp. 152-153.)
510	8953	U.S.A. ...	*Saran Tubing (Dow Chemical Company).* (Plastics, Vol. 7, No. 71, April, 1943, p. 159.)
511	8954	G.B.	*Plastic Film and Sheet for Small Coil Insulation.* (E. E. Halls, Plastics, Vol. 7, No. 71, April, 1943, pp. 162-170.)
512	8955	G.B.	*Spraying of Plastic.* (Plastics, Vol. 7, No. 71, April, 1943, p. 170.)
			Rubber (including Synthetic).
513	8156	Canada ...	*Synthetic Rubber from Petroleum in Canada.* (Petroleum Times, Vol. 47, No. 1,187, 23/1/43, p. 29.)
514	8173	Sweden and Roumania ...	*Synthetic Rubber in Sweden and Roumania.* (Inter. Avia., No. 847, 10/12/42, p. 18.)
515	8258	U.S.A. ...	*Cold Resisting Synthetic Rubber.* (P. A. Anderson, Aero Digest, Vol. 41, No. 6, Dec., 1942, pp. 184 and 279.)

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516	8328	G.B.	*Development of Rubber Production.* (Engineering, Vol. 155, No. 4,025, 5/3/43, p. 193.)
517	8337	G.B.	*Rubber—Natural and Synthetic.* (S. S. Pickles, Plastics, Vol. 7, No. 70, March, 1943, p. 127.)
518	8356	U.S.A. ...	*Measurement of Density of Synthetic Rubbers.* (L. A. Wood and others, J. Res. Bur. of Stands., Vol. 29, No. 6, Dec., 1942, pp. 391-396.)
519	8367	G.B.	*Synthetic Rubber from Soya Beans—"Agripol."* (British Plastics, Vol. 14, No. 166, March, 1943, p. 589.)
520	8374	G.B.	*Synthetic Rubber Brings Improved Characteristics.* (British Plastics, Vol. 14, No. 166, March, 1943, p. 596.)
521	8392	U.S.A. ...	*Rubber from Russian Dandelion (Planted in New Jersey).* (Ind. and Eng. Chem., Vol. 21, No. 2, 25/1/43, p. 102.)
522	8394	U.S.A. ...	*Agripol Synthetic Rubber from Soya Beans.* (Ind. and Eng. Chem., Vol. 21, No. 2, 25/1/43, p. 108.)
523	8460	U.S.A. ...	*Butadene from Grain Alcohol.* (Ind. and Eng. Chem., Vol. 21, No. 3, 20/2/43, p. 187.)
524	8461	U.S.A. ...	*Rubber from Quayule Crops.* (Ind. and Eng. Chem., Vol. 21, No. 3, 20/2/43, p. 187.)
525	8462	U.S.A. ...	*Neopol (Synthetic Rubber) from Vegetable Oils.* (Ind. and Eng. Chem., Vol. 21, No. 3, 20/2/43, p. 187.)
526	8463	Mexico ...	*Rubber from Mexican Plantations.* (Ind. and Eng. Chem., Vol. 21, No. 3, 20/3/43, p. 187.)
527	8476	G.B.	*Rubber Mouldings with a Felt Cord.* (Sheet Metal Industries, Vol. 16, No. 187, Nov., 1942, p. 1,674.)
528	8534	U.S.A. ...	*Vinyl Acetal Replaces Rubber in Fabrics.* (Sci. Am., Vol. 168, No. 1, Jan., 1943, pp. 9-10.)
529	8919	G.B.	*Soft Plastic as a Rubber Substitute (Ethyl Cellulose).* (Machinery, Vol. 62, No. 1,584, 18/2/43, p. 186.)
			Glass, Ceramics and Diamonds.
530	8198	G.B.	*New Optical Glasses.* (Kodak, Ltd., J. Scientific Instruments, Vol. 19, No. 6, June, 1942, p. 94.)
531	8331	G.B.	*Dielectric or Puncture strength of Porcelain and other Ceramic Materials.* (E. Rosenthal, Electronic Engineering, Vol. 15, No. 181, 8/3/43, pp. 408-411.)
532	8391	Denmark ...	*New Glass Insulating Material.* (Ind. and Eng. Chem., Vol. 21, No. 2, 25/1/42, p. 96.)
533	8446	U.S.A. ...	*Sanding Plexiglass Bomber Nose.* (Aero Digest, Vol. 42, No. 1, Jan., 1943, p. 349.)
534	8537	U.S.A. ...	*Added Uses of Ceramics in Wartime.* (Sci. Am., Vol. 168, No. 1, Jan., 1943, pp. 27-28.)
535	8538	U.S.A. ...	*Wartime Uses of Glass.* (R. A. Miller, Sci. Am., Vol. 168, No. 1, Jan., 1943, pp. 22-24.)
536	8544	U.S.A. ...	*"Glasholm" Flexible Heating Elements.* (Sci. Am., Vol. 168, No. 1, Jan., 1943, p. 37.)

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537	8859	Germany ...	*Modern Methods for Cutting Diamonds (including Drilling and Polishing).* (W. Dawihl and O. Fritsch, Z.V.D.I., Vol. 85, No. 11, 15/3/41, pp. 265-268.)
538	8862	G.B. ...	... *Glass to Replace Steel in Gauges for Inspection Work.* (Engineer, Vol. 175, No. 4,551, 2/4/43, pp. 273-275.)
			Resins (including Synthetic).
540	8336	G.B. ...	... *Resin Laminated Densified Wood.* (A. E. L. Jervis, Plastics, Vol. 7, No. 70, March, 1943, pp. 122-127.)
541	8338	G.B. ...	... *Resinoids and Other Plastics as Film Formers.* (B. J. Brajmkoff, Plastics, Vol. 7, No. 70, March, 1943, pp. 131-138.)
542	8366	G.B. ...	... *Synthetic Resin Dispersions and Their Use as Substitutes for Latex.* (C. M. Jackson, British Plastics, Vol. 14, No. 166, March, 1943, pp. 577-582.)
543	8389	Brazil ...	*Resin Produced from a Climbing Plant (Rosinliana).* (Ind. and Eng. Chem., Vol. 21, No. 2, 25/1/43, p. 95.)
544	8444	U.S.A. ...	*Phenolic Casting Resin.* (Aero Digest, Vol. 42, No. 1, Jan., 1943, p. 340.)
			B. Fabrication.
			Welding.
545	8224	G.B. ...	... *Semi-Automatic Deck Welder ("Murex").* (Engineering, Vol. 155, No. 4,025, 5/3/43, p. 186.)
546	8339	G.B. ...	... *Welding of Thermo-Plastics.* (Henning, Plastics, Vol. 7, No. 76, March, 1943, pp. 97-102.)
547	8353	G.B. ...	... *Spot Welding of Al. Alloys.* (Metal Industry, Vol. 62, No. 11, 12/8/42, pp. 168-169.)
548	8354	G.B. ...	... *Arc Welding Machine.* (Metal Industry, Vol. 62, No. 11, 12/8/42, pp. 171-172.)
549	8364	G.B. ...	... *Surface Preparation of Al. Alloys for Spot Welding.* (Metal Industry, Vol. 62, No. 12, 19/3/43, pp. 184-185.)
550	8466	G.B. ...	... *Welding and Cutting Equipment.* (H. Ullmer, Sheet Metal Industries, Vol. 17, No. 189, Jan., 1943, pp. 131-135.)
551	8467	G.B. ...	... *Resistance Welding Machine.* (Sheet Metal Industries, Vol. 17, No. 189, Jan., 1943, p. 136.)
552	8470	G.B. ...	... *Stud Welding.* (J. W. Macfarlane, Sheet Metal Industries, Vol. 16, No. 187, Nov., 1942, pp. 1,729-1,733.)
553	8472	G.B. ...	... *Effect of Grain Size on Weldability.* (Sheet Metal Industries, Vol. 16, No. 187, Nov., 1942, p. 1,737.)
554	8473	G.B. ...	... *Light Alloy Resistance Welding in Aircraft Construction.* (*R.T.P. Translation No.* 1,344.) (R. Schnarg, Sheet Metal Industries, Vol. 16, No. 187, Nov., 1942, pp. 1,738-1,741.)

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555	8475	G.B.	...	*Repair and Maintenance by Modern Scientific Welding Processes.* (C. W. Brett, Sheet Metal Industries, Vol. 16, No. 187, Nov., 1942, pp. 1,743-1,746.)
556	8491	G.B.	...	*Arc Welding and War Productions.* (Prod. and Eng. Bull., Vol. 2, No. 3, Dec., 1942, pp. 131-138.)
557	8492	G.B.	...	*Methods of Improving Arc Welding Production.* (Prod. and Eng. Bull., Vol. 2, No. 3, Dec., 1942, pp. 99-102.)
558	8524	G.B.	...	*Report of the Welding Sub-Committee of I.P.E.* (J. Inst. Prod. Engs., Vol. 21, No. 12, Dec., 1942, pp. 491-516.)
559	8562	G.B.	...	*Technique for the Gas Welding of Rolled Al. and Al. Alloy Castings.* (Welding Research Council Report, No. 229, July, 1942.)
560	8814	G.B.	...	*Welding Applied to Jigs and Tools.* (Prod. and Eng. Bull., Vol. 2, No. 2, Nov., 1942, pp. 87-91.)
561	8832	G.B.	...	*Arc Welding (Photographs).* (Machinist, Vol. 86, No. 40, 16/1/42, pp. 1,081-1,082.)
562	8909	Germany	...	*Bibliography of Published Information on German Welding Practice.* (1, Welding—General; 2, Welding of Iron and Steel; 3, Welding of Light Alloys; 4, Gas Welding; 5, Electric Welding; 6, Arc Welding; 7, Spot Welding; 8, Testing of Welds.) (R.T.P.3, Bibliography No. 84, March, 1943, Issued by the Ministry of Aircraft Production.)
563	8952	Germany	...	*Welding of Thermo-Plastics (from the German).* (Plastics, Vol. 7, No. 71, April, 1943, pp. 154-158.)
				Grinding, Machining, Surface Finishing.
564	8266	U.S.A.	...	*Machining Lucite (Handling Technique).* (Aero Digest, Vol. 41, No. 6, Dec., 1942, pp. 194-195.)
565	8341	G.B.	...	*Pipe Flange Grinding Machine.* (Engineer, Vol. 175, No. 4,548, 12/3/43, p. 217.)
566	8346	G.B.	...	*Pipe Flange Grinding Machine.* (Engineering, Vol. 155, No. 4,026, 12/3/43, p. 207.)
567	8350	G.B.	...	*Some Aspects of Machining.* (A. Behr, Metal Industry, Vol. 62, No. 11, 12/3/43, pp. 162-165.)
568	8474	U.S.A.	...	*A New Surface Finishing Process.* (Sheet Metal Industries, Vol. 16, No. 187, Nov., 1942, p. 1,742.)
569	8589	G.B.	...	*Thread Grinding* (1930 *to date*). (Sci. Lib., Bibliog. Series, No. 581.)
570	8666	G.B.	...	*Grinding Closely Pitched Serrations on Form Tool.* (A. Scott, Machinist, Vol. 86, No. 83, 28/11/42, p. 210.)
571	8834	G.B.	...	*Finishing of Sprayed Metals.* (W. C. Reid, Machinist, Vol. 86, No. 40, 16/1/43, pp. 1,084-1,087.)
572	8913	G.B.	...	*Grinding Wheel Grits, Grades and Bonds.* (Machinery, Vol. 62, No. 1,586, 4/3/43, pp. 241-242.)

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573	8915	G.B. ...	...	*Grinding Delors Stellite Tools.* (Machinery, Vol. 62, No. 1,587, 11/3/43, pp. 268-269.)
				Electro-Plating, Anti-Corrosion Coatings, etc.
574	8330	G.B. ...	...	*Boiler Tube Corrosion Detector.* (Metro. Vickers, Engineering, Vol. 155, No. 4,025, 5/3/43, p. 200.)
575	8351	G.B. ...	...	*Production of Patterns by Electro-Deposition.* (A. K. Laukel, Metal Industry, Vol. 62, No. 11, 12/8/43, pp. 165-166.)
576	8361	U.S.A.	...	*Surface Active Agents Manufactured in America (Table).* (Ind. and Eng. Chem. (Ind. Ed.), Vol. 35, No. 1, Jan., 1943, pp. 126-130.)
577	8362	G.B. ...	...	*New Methods for Examination of Corroded Metal —I—Qualitative Examination.* (F. A. Champion, Metal Industry, Vol. 62, No. 12, 19/3/42, pp. 178-181.)
578	8365	G.B. ...	...	*Electro-Deposited Rust Proofing Coatings.* (H. Silman, Metal, Industry, Vol. 62, No. 12, 19/3/43, pp. 186-188.)
579	8388	G.B. ...	...	*Corrosion Prevention of Mg. Alloys.* (Ind. and Eng. Chem., Vol. 2, No. 2, 25/1/43, p. 94.)
580	8464	G.B. ...	...	*Methods of Measuring Thickness and Porosity of Metallic Coatings (Magnetic, etc.).* (A. Brenner, Sheet Metal Industries, Vol. 17, No. 189, Jan., 1943, pp. 81-84.)
581	8465	G.B. ...	...	*Zinc Plating.* (W. Eckert, Sheet Metal Industries, Vol. 17, No. 189, Jan., 1943, pp. 109-110 and 114.)
582	8469	G.B. ...	...	*The Causes of Fishscaling.* (W. W. Higgins, Sheet Metal Industries, Vol. 16, No. 187, Nov., 1942, pp. 1,724-1,726.)
583	8471	G.B. ...	...	*The Elimination of Oxide Films.* (Sheet Metal Industries, Vol. 16, No. 187, Nov., 1942, p. 1,737.)
584	8552	G.B. ...	...	*New Methods for Examination of Corroded Metal (Quantitative).* (F. A. Champion, Metal Industry, Vol. 62, No. 13, 26/3/43, pp. 202-204.)
585	8554	G.B. ...	...	*Metal Cleaning in Wartime.* (Metal Industry, Vol. 62, No. 13, 26/3/43, pp. 199-200.)
586	8558	G.B. ...	...	*Reclamation of Worn Parts of Road Motor Vehicles (Metal Spraying, Oxyacetylene Welding, etc.).* (Engineer, Vol. 155, No. 4,550, 26/3/43, pp. 255-256.)
587	8837	G.B. ...	...	*Measuring Thickness of Plating on Steel Parts (Magnetic Induction of Air Gap).* (E. S. Gallagher, Machinist, Vol. 86, No. 42, 30/1/43, pp. 1,155-1,161.)
588	8864	G.B. ...	...	*Electro-Deposited Rustproofing Coatings.* (H. Silman, Metal Industry, Vol. 62, No. 14, 2/4/43, p. 220.)
589	8865	G.B. ...	...	*Process Lines for Electrolytic Tinplate.* (J. Raymond Erbe, Metal Industry, Vol. 62, No. 14, 2/4/43, p. 218.)

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590	8867	G.B.	...	*Coatings for Cores and Moulds.* (J. A. Ridderhof, Metal Industry, Vol. 62, No. 14, 2/4/43, pp. 210-212.)
591	8922	G.B.	...	*Electro-Plating of Non-Conducting Materials (Acheson Process).* (Machinery, Vol. 62, No. 1,585, 25/2/43, p. 210.)
592	8533	U.S.A.	...	*Recent Developments in Tin-Plating.* (A. P. Peck, Sci. Am. Vol. 168, No. 1, Jan., 1943, pp. 7-9.)
				Heat Treatment and Hardening.
593	8531	G.B.	...	*Heat Treatment (with Discussion).* (D. C. Harris, J. Inst. Prod. Engs., Vol. 21, No. 9, Sept., 1942, pp. 345-362.)
594	8543	U.S.A.	...	*Heat Treating Steel.* (Sci. Am., Vol. 168, No. 1, Jan., 1943, p. 29.)
595	8551	G.B.	...	*Hardness Changes Accompanying the Ordering of Beta Brass.* (C. S. Smith, Metal Ind., Vol. 62, No. 13, 26/3/43, pp. 197-198.)
596	8758	Germany	...	*Single or Double Hardening for Motor Car Transmission Gear Wheels made of Case Hardening Steel.* (H. Glaubitz, A.T.Z., Vol. 46, No. 1, 10/1/43, pp. 9-12.)
597	8830	G.B.	...	*How to Use Hardness Tests.* (T. H. Gray, Machinist, Vol. 86, No. 40, 16/1/43, pp. 1,075-1,078.)
598	8931	G.B.	...	*Case Hardening of Steel.* (Machinery, Vol. 62, No. 1,583, 11/2/43, pp. 152-156.)
599	8833	G.B.	...	*Flame Hardening with Coal Gas (Automatic Set Ups).* (R. F. Apter and H. W. Smith, Machinist, Vol. 86, No. 40, 16/1/43, pp. 1,088-1,090.)
				Drawing, Bonderising and Etching.
600	8341	G.B.	...	*New Method of Etching on Metals.* (Engineer, Vol. 175, No. 4,548, 12/3/43, p. 217.)
601	8369	G.B.	...	*Improving the Mould Drawing.* (British Plastics, Vol. 14, No. 166, March, 1943, pp. 607-615.)
602	8573	G.B.	...	*Deep Drawing Research, Review of Available Literature.* (H. W. Swift, I.A.E. Report, No. 1,941-1,943, April, 1941.)
603	8574	G.B.	...	*Deep Drawing Research at Sheffield University.* (H. W. Swift, I.A.E. Report, No. 1,941-1,944, April, 1941.)
604	8596	G.B.	...	*Bonderising.* (Sci. Lib., Bibliog. Series, No. 577.)
				Powder Metallurgy.
605	8355	G.B.	...	*Powder Metallurgy in America (Methods).* (Metal Industry, Vol. 62, No. 11, 12/3/43, p. 172.)
606	8408	G.B.	...	*Powder Metallurgy.* (W. D. Jones, Engineering, Vol. 155, No. 4,027, 19/3/43, p. 224.)
607	8425	U.S.A.	...	*Powder Metallurgy.* (F. M. Reck, Aero Digest, Vol. 42, No. 1, Jan., 1943, pp. 170-174.)
608	8725	G.B.	...	*Powder Metallurgy.* (W. D. Jones, Engineering, Vol. 155, No. 4,028, 26/3/42, pp. 244-245.)
609	8923	G.B.	...	*Application of Powder Metallurgy.* (W. D. Jones, Machinery, Vol. 62, No. 1,585, 25/2/43, p. 219.)

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			Castings.
610	8363	G.B. ...	... *Foundry Technique for Pressure Castings.* (F. Dunleary, Metal Industry, Vol. 62, No. 12, 19/3/43, pp. 182-183.)
611	8523	G.B. ...	... *Production of Steel Castings (with Discussion).* (F. W. Roe, J. Inst. Prod. Engs., Vol. 21, No. 12, Dec., 1942, pp. 469-490.)
612	8724	G.B. ...	... *Rotary Furnace for Steel Castings.* (F. A. Lemon and H. O'Neil, Engineering, Vol. 155, No. 4,028, 26/3/43, pp. 257-260.)
613	8968	G.B. ...	... *Production of Rotary Furnaces of Steel for Castings.* (F. A. Lemon and H. O'Neil, Engineering, Vol. 153, No. 4,029, 2/4/43, pp. 279-280.)
			Dies, Extrusion and Stamping.
614	8479	G.B. ...	... *Brazed Strippers Lengthens Life of Metal Stamping Dies.* (Sheet Metal Industries, Vol. 16, No. 187, Nov., 1942, p. 1,710.)
615	8924	G.B. ...	... *Die Cast Zip Fasteners (Zinc Alloy).* (Machinery, Vol. 62, No. 1,585, 25/2/43, p. 219.)
			C. Inspection.
			Machines and Machine Tools.
616	8182	Germany	... *The Dynamics of Machine Tools (with Extensive Bibliography).* (W. Schmidt, Z.V.D.I., Vol. 85, No. 11, 15/3/41, pp. 249-258.)
617	8199	G.B. ...	... *Jig Borer Microscope.* (E. R. Watts, Ltd., J. Scientific Instrum., Vol. 19, No. 6, June, 1942, p. 94.)
618	8343	G.B. ...	... *Some Textile Finishing Machines.* (K. S. Laurie, Engineer, Vol. 175, No. 4,548, 12/3/43, pp. 218-220.)
619	8348	G.B. ...	... *Textile Finishing Machines.* (K. S. Laurie, Engineering, Vol. 158, No. 4,026, 12/3/43, pp. 218-220.)
620	8412	G.B. ...	... *Textile Finishing Machines.* (K. S. Laurie, Engineering, Vol. 155, No. 4,027, 19/3/43, pp. 237-240.)
621	8413	G.B. ...	... *Recent Developments of Carbide-Tipped Tools.* (Engineering, Vol. 155, No. 4,027, 19/3/43, p. 236.)
622	8424	U.S.A.	... *Machine Tools Keeping the Pace.* (T. Burna, Aero Digest, Vol. 42, No. 1, Jan., 1943, pp. 163-169.)
623	8445	U.S.A.	... *Speed-Designed Milling Machine.* (Aero Digest, Vol. 42, No. 1, Jan., 1943, pp. 342-343.)
624	8481	G.B. ...	... *Universal Crack Detector.* (Metro. Vickers, J. Scientific Instruments, Vol. 19, No. 7, July, 1942, p. 109.)
625	8482	G.B. ...	... *New Electro-Mechanical Gauges for Measuring Strip.* (J. Scientific Insts., Vol. 19, No. 7, July, 1942, p. 111.)
626	8669	G.B. ...	... 3,000 *Ton Hydraulic Press will Bend Armour Plate.* (Machinist, Vol. 86, No. 83, 28/11/42, p. 854.)

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627	8670	G.B. ...	*Sheet Stretching Press to Replace Manually Operated Machines.* (Machinist, Vol. 86, No. 83, 28/11/42, p. 853.)
628	8757	Germany	*Modern Machine Tools for the Manufacture of Motor Car Engines.* (J. Wullenhaupt, A.T.Z., Vol. 46, No. 1, 10/1/43, pp. 1-8.)
629	8813	G.B. ...	*Bismuth Alloys in Press Tool Construction.* (Prod. and Eng. Bull., Vol. 2, No. 2, Nov., 1942, pp. 93-96.)
630	8835	G.B. ...	*Close Tolerance Screw Threads (Wright Aeronautical Corp.).* (P. W. Brown, Machinist, Vol. 86, No. 42, 30/1/43, pp. 1,151-1,154.)
631	8839	G.B. ...	*Gears and Gear Cutting.* (A. H. Candee, Machinist, Vol. 86, No. 42, 30/1/43, pp. 1,162-1,164.)
632	8916	G.B. ...	*The Operation of the Frame Gauging System.* (Machinery, Vol. 62, No. 1,584, 18/2/43, pp. 169-173.)
633	8965	G.B. ...	*"Creep" Process in Gear Cutting.* (Engineering, Vol. 153, No. 4,029, 2/4/43, p. 275.)
			Testing and Test Equipment.
634	8151	Germany	*New Apparatus for the Non-Destructive Testing of Materials.* (Schweizerische Technische Zeitschrift, 1942, p. 562.)
635	8154	G.B. ...	*The Electron Microscope and its Uses (Discussion).* (R. B. Barnes and C. J. Barton, A.S.T.M. Bulletin, No. 118, Oct., 1942, p. 12.)
636	8185	U.S.A.	*A.S.T.M. Standards, Non-Metallic Materials (General).* (Am. Soc. for Testing Materials, Part III, 1942.)
637	8195	Germany	*The Testing of Holes, Fundamental Considerations.* (Dr. Berndt, A.T.Z., Vol. 43, No. 16, 25/8/40, pp. 407-411.)
638	8360	U.S.A.	*The Electron Microscope and Cellulose.* (R. B. Barnes and C. J. Burton, Ind. and Eng. Chem. (Ind. Ed.), Vol. 35, No. 1, Jan., 1943, pp. 120-125.)
639	8457	U.S.A.	*Ultra-Violet Rays in Examination of Metallic Surfaces.* (Ind. and Eng. Chem., Vol. 21, No. 3, 20/2/43, p. 182.)
640	8483	G.B. ...	*Electro-Magnetic Induction Micrometers, with Metal Rectifiers.* (R. J. Cox, J. Scientific Instruments, Vol. 19, No. 8, Aug., 1942, pp. 117-120.)
641	8486	G.B. ...	*Magnetic Material Testing, Using Cathode Ray Oscillograph with Electrostatic Diflexion only.* (K. Kreielsheimer, J. Scientific Insts., Vol. 19, No. 9, Sept., 1942, pp. 137-139.)
642	8487	G.B. ...	*Cathode Sputtering and Vacuum Evaporation.* (Light Metals, Vol. 6, No. 61, Feb., 1943, pp. 56-79.)
643	8607	U.S.A.	*Application of Rank Correlation to the Development of Testing Methods (Treatment of Non-Dimensional Qualitative Results).* (E. R. Schwarz and K. R. Fox, A.S.T.M. Bulletin, No. 119, Dec., 1942, pp. 21-24.)

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644	8726	G.B.	...	*High Speed Cathode Ray Oscillography.* (Engineering, Vol. 155, No. 4,028, 26/3/43, pp. 241-242.)
645	8728	Germany	...	*Bibliography of Published Information on Material Testing (German Work Covering the Period* 1936-1943). (1, Material Testing—General; 2, Fatigue; 3, Tensile Testing; 4, Creep; 5, Hardness; 6, Impact Strength; 7, Surface Finish; 8, Wear; 9, Magnetic Testing; 10, Radiographic Methods; 11, Chemical Methods; 12, Stress Optical Methods; 13, Electronic Methods; 14, Spectographic Analysis; 15, Acoustical Methods; 16, Statistical Methods.) (R.T.P.3, Bibliography No. 83, Issued by the Ministry of Aircraft Production, March, 1943.)
646	8961	G.B.	...	*Solubility of Metals in Mercury (Digest).* (C. H. Prescott, Elect. Eng., Vol. 15, No. 182, April, 1943, p. 483.)
				Instruments.
				Flight.
647	8430	U.S.A.	...	*Vultee Radio Flight Test Recorder.* (Aero Digest, Vol. 42, No. 1, Jan., 1943, p. 201.)
648	8480	G.B.	...	*Examination of German Aircraft Navigation Instruments.* (F. Postlethwaite, J. Scientific Insts., Vol. 19, No. 7, July, 1942, pp. 97-101.)
649	8546	U.S.A.	...	*Portable Flight Recorder.* (A. Klemin, Sci. Am., Vol. 168, No. 1, Jan., 1943, p. 41.)
650	8723	G.B.	...	*Instructional Films on the Operation of Sperry Gyroscopic Instruments.* (Flight, Vol. 43, No. 1,787, 25/3/43, p. 317.)
				Mathematical.
651	8234	Germany	...	*Slide Rule for the Rapid Determination of Weight of Sheet Metals and Profile of Various Shapes.* (Flugsport, Vol. 35, No. 5, 3/3/43, p. 50.)
652	8590	G.B.	...	*Reading List on Arithmetical Calculating Machines* (1937 *to Date*). (Sci. Lib., Bibliog. Series, No. 582.)
653	8652	U.S.A.	...	*Micro Scale for Close Work on Aircraft, etc.* (Rev. of Scient. Insts., Vol. 14, Jan., 1943, p. 25.)
				Miscellaneous.
655	8604	U.S.A.	...	*An Electrical Contact Testing Machine.* (A. M. Sugge, A.S.T.M. Bulletin, No. 119, Dec., 1942, pp. 25-30.)
656	8649	U.S.A.	...	*Accurate High Sensitivity Apiezon Oil Gauge.* (J. Bannon, Rev. Scient. Insts., Vol. 14, No. 1, Jan., 1943, pp. 6-10.)
657	8651	U.S.A.	...	*Du Mont High Frequency Oscillograph.* (Rev. of Scient. Insts., Vol. 14, No. 1, Jan., 1942, p. 24.)
				Production.
				Organisation and Control.
658	8207	U.S.A.	...	*American War Production.* (Inter. Avia., No. 847, 10/12/42, pp. 1-7.)

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659	8208	U.S.A.	...	*American War Production.* (Inter. Avia., No. 848-849, 21/12/42, pp. 1-9.)
660	8277	U.S.A.	...	*U.S. Aircraft Missions to G.B. (Factory Survey).* (Aero Digest, Vol. 41, No. 6, Dec., 1942, pp. 118-120, 243 and 300-307.)
661	8280	U.S.A.	...	*Performance Quality Control in Manufacture of Hydraulic Parts.* (H. A. Zimmerman, Aero Digest, Vol. 41, No. 6, Dec., 1942, pp. 261-271.)
662	8302	U.S.A.	...	*S.A.E. Aeronautical Standards.* (Soc. of Automotive Eng. Inc., Nov. 1st, 1942.)
663	8426	U.S.A.	...	*Solving New Production Problems on Standard Automatic Machines.* (H. L. Pope, Aero Digest, Vol. 42, No. 1, Jan., 1943, pp. 176-180.)
664	8427	G.B.	...	*Report of Research Dept. (Inst. Prod. Engs.).* (G. Schlesinger, Surface Finish, Jan., 1942.)
665	8443	U.S.A.	...	*Wartime Production Short Cuts.* (Aero Digest, Vol. 42, No. 1, Jan., 1943, pp. 330-336.)
666	8449	U.S.A.	...	*Detroit Engaged on War Productions.* (R. B. Bennet, Ind. and Eng. Chem., Vol. 21, No. 3, 20/2/43, pp. 153-156.)
667	8454	U.S.S.R.	...	*The Growth of Industry in the U.S.S.R.* (J. G. Tolpin, Ind. and Eng. Chem., Vol. 21, No. 3, 20/2/43, pp. 166-169.)
668	8455	India	...	*Chemical Industrial Growth in India.* (Ind. and Eng. Chem., Vol. 21, No. 3, 20/2/43, p. 169.)
669	8493	G.B.	...	*Production Charts as Incentives to Increased Output.* (Prod. and Eng. Bull., Vol. 2, No. 3, Dec., 1942, pp. 115-118.)
670	8525	G.B.	...	*Memorandum on the Inspection and Control of Quality Spot Welds in Mild Steel. (Ministry of Supply Welding Memorandum, No. 8.)* (Enclosure.) (J. Inst. Prod. Eng., Vol. 21, No. 12, Dec., 1942.)
671	8529	G.B.	...	*Developments in Quality Control. (Technical Bulletin No. 17, I.P.E.)* (J. Inst. Prod. Eng., Vol. 21, No. 10, Oct., 1942.)
672	8532	G.B.	...	*Plant and Labour Utilisation (I.P.E.).* (J. Inst. Prod. Engs., Vol. 21, No. 9, Sept., 1942.)
673	8564	G.B.	...	*Accuracy in Machine Tools. (How to Measure and Maintain it.)* (G. Schlesinger, Research Dept., Inst. Prod. Engs., 17/11/42.)
674	8566	G.B.	...	*Acceptance Test Charts for Machine Tools, Pt. I.* (Prepared by Research Dept., Inst. Prod. Engs., March, 1940.)
675	8567	G.B.	...	*Acceptance Test Charts for Machine Tools (Part II).* (Prepared by Research Dept., Inst. Prod. Engs., Dec., 1941.)
676	8717	Japan	...	*Jap. Planning of Economic Resources.* (Flight, Vol. 43, No. 1,787, 25/3/43, p. 310.)
				Training and Education.
677	8232	Germany	...	*Women in Industry (Photo).* (Flugsport, Vol. 35, No. 5, 3/3/42, p. 55.)
678	8327	G.B.	...	*The Education and Training of Engineers.* (Engineering, Vol. 155, No. 4,025, 5/3/43, pp. 191-192.)

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679	8340	G.B.	*Education and Training of Engineers.* (Engineer, Vol. 175, No. 4,548, 12/3/43, pp. 207-208.)
680	8385	U.S.A. ...	*Women Chemists in Detroit War Production.* (H. I. Miner, Ind. and Eng. Chem., Vol. 21, No. 2, 25/1/43, pp. 80-83.)
681	8386	G.B.	*Engineering Courses for Women in the U.S.A.* (Ind. and Eng. Chem., Vol. 21, No. 2, 25/1/43, p. 85.)
682	8421	U.S.A. ...	*Training Workers for Machine Tool Operation.* (J. W. Busman, Aero Digest, Vol. 42, No. 1, Jan., 1943, pp. 116-125 and 254-256.)
			Methods (General).
683	8526	G.B.	*Precision Patterns for Sheet Metal Work. (Technical Bull., No. 19, I.P.E.)* (Enclosure.) (J. Inst. Prod. Engs., Vol. 21, No. 12, Dec., 1942.)
684	8536	U.S.A. ...	*"Tocco" Hardening Machine Speeds Production.* (Sci. Am., Vol. 168, No. 1, Jan., 1943, p. 10.)
685	8732	U.S.A. ...	*The Vidal Process for Moulded Structures.* (E. E. Miller, Aviation, Vol. 41, No. 10, Oct., 1942, pp. 124-127 and 299.)
686	8815	G.B.	*Broaches (Inspection and Reconditioning).* (Prod. and Eng., Bull., Vol. 2, No. 2, Nov., 1942, pp. 84-85.)
687	8917	G.B.	*Boring Mills for Tank Turret Production.* (Machinery, Vol. 62, No. 1,584, 18/2/43, pp. 178-181.)
			Methods (Aircraft).
688	8262	U.S.A. ...	*Bomber Fuselage Assembly at De Soto Works.* (F. M. Reck, Aero Digest, Vol. 41, No. 6, Dec., 1942, pp. 188-192.)
689	8275	U.S.A. ...	*Gliders Built by Ford.* (Aero Digest, Vol. 41, No. 6, Dec., 1942, pp. 234 and 288-290.)
690	8420	U.S.A. ...	*Producing Aircraft Parts at the Aluminium Mill.* (M. H. Froelich, Aero Digest, Vol. 42, No. 1, Jan., 1943, pp. 104-114.)
691	8435	U.S.A. ...	*Crating the Curtiss P. 40 for Export Shipment.* (Aero Digest, Vol. 42, No. 1, Jan. 1943, pp. 222-227 and 314-316.)
692	8436	U.S.A. ...	*Lofting Problems of Streamlined Bodies.* (C. M. Hartley and R. A. Liming, Aero Digest, Vol. 42, No. 1, pp. 234-240.)
693	8520	U.S.A. ...	*Beaufort at End of Assembly Line (Built in Australia) (Photo).* (Aviation, Vol. 41, No. 5, May, 1942, p. 222.)
694	8612	U.S.A. ...	*Ryan in Production on Navy Scout Plane S.O.R.-1.* (Am. Av., Vol. 222, No. 10, 15/10/42, p. 36.)
695	8622	G.B.	*Production of Sunderland II Flying Boats (Photos).* (Aeroplane, Vol. 64, No. 1,651, 15/1/43, p. 64.)
696	8730	U.S.A. ...	*Prefabricating Aircraft Parts at Reynolds.* (Aviation, Vol. 41, No. 10, Oct., 1942, pp. 108-113.)
697	8911	G.B.	*Avro Lancaster Production (Drawing and Stretching on Light Alloy Sections).* (Machinery, Vol. 62, No. 1,586, 4/3/43, pp. 225-232.)

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698	8914	G.B. ...	*Sheet Metal Forming and Pipe Bending in the Production of Lancaster Bombers.* (Machinery, Vol. 62, No. 1,587, 11/3/43, pp. 262-266.)
699	8927	G.B. ...	*Methods in the Production of Fighter Trainers.* (Machinery, Vol. 62, No. 1,582, 4/2/43, pp. 120-127.)
			Methods (Engines).
700	8429	U.S.A.	*Mass Production of Allison Engine Parts.* (Aero Digest, Vol. 42, No. 1, Jan., 1943, pp. 191-198.)
701	8434	U.S.A.	*Machining "Cyclone" Cylinders.* (Aero Digest, Vol. 42, No. 1, Jan., 1943, pp. 219-220 and 317-318.)
702	8528	G.B. ...	*Turbine Blade Production (with Discussion).* (J. Henderson, J. Inst. Prod. Engs., Vol. 21, No. 10, Oct., 1942, pp. 363-387.)
703	8912	G.B. ...	*Operations on Magnesium Parts of Bomber Engines.* (Machinery, Vol. 62, No. 1,586, 4/3/43, pp. 236-242.)
704	8926	G.B. ...	*Special Equipment in the Production of the Merlin Engine.* (Machinery, Vol. 62, No. 1,582, 4/2/43, pp. 113-117.)
			Methods (Guns and Explosives).
705	8668	G.B. ...	*Production Operations on 37 mm. H.E. Shell.* (Machinist, Vol. 86, No. 83, 28/11/42, pp. 837-848.)
706	8918	G.B. ...	*Production of Cartridge Links for Machine Guns.* (Machinery, Vol. 62, No. 1,584, 18/2/43, pp. 184-186.)
707	8921	G.B. ...	*Production of 20 mm. Practice Shell for Aircraft Cannon.* (Machinery, Vol. 62, No. 1,585, 25/2/43, pp. 197-202.)
			Methods (Rivets, Gears).
708	8236	Germany	*Steel Sheathed Light Alloy Rivets. (Pat. series No. 49, No. 728,571).* (Dornier, Flugsport, Vol. 35, No. 5, 3/3/43, p. 201.)
709	8329	G.B. ...	*High-Speed Helical Gear Production.* (S. A. Couling, Engineer, Vol. 155, No. 4,025, 5/3/43, pp. 197-200.)
710	8477	G.B. ...	*Rapid Production of Sheet Metal Drums.* (A. G. Arend, Sheet Metal Industries, Vol. 16, No. 187, Nov., 1942, pp. 1,674-1,677.)
711	8611	U.S.A.	*Explosive Rivets Speed Aircraft Repairs.* (Am. Av., Vol. 222, No. 10, 15/10/42, p. 38.)
712	8844	Germany	*Locking Nut for Holding Sheet Metal in Position Prior to Riveting. (Pat. series 48, No. 728,722.)* (Gottingen Al. Works, Flugsport, Vol. 35, No. 4, 17/2/43, p. 200.)
713	8845	Germany	*Adjustable Lock-Nut for Glueing Operations. (Pat. series 48, No. 729,521.)* (Gotha, Flugsport, Vol. 35, No. 4, 17/2/43, p. 200.)

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			Workers' Welfare.
714	8935	U.S.A. ...	*Industrial Illness Due to Tetryl. Report of* 1,258 *Cases. L. J. Witkowski and others, J. Amer. Med. Ass., Vol.* 119, *No.* 17, *Aug. 22nd*, 1942, *pp.* 1,406-1,409.) (Bull. of War Med., Vol. 3, No. 7, March, 1943, pp. 412-413.)
715	8936	U.S.A. ...	*Silicosis Among Naval Foundrymen. (E. W. Brown and W. F. Klien, U.S. Nav. Med. Bull., Vol.* 40, *No.* 1, *Jan.*, 1942, *pp.* 42-52.) (Bull. of War Med., Vol. 3, No. 7, March, 1943, pp. 413-414.)
			Factory Ventilation, etc.
716	8274	U.S.A. ...	*Increasing Plant Illumination (White Cement Floors).* (Aero Digest, Vol. 41, No. 6, Dec., 1942, pp. 234 and 288-290.)
717	8503	U.S.A. ...	*Innovations in Aeroplane Plant Design.* (M. M. Valentine, Aviation, Vol. 41, No. 5, May, 1942, pp. 96-97 and 248.)
718	8735	U.S.A. ...	*New Shadowless Lighting in Aircraft Plant.* (Aviation, Vol. 41, No. 10, Oct., 1942, p. 144.)
719	8937	U.S.A. ...	*Industrial Ventilation in War: A Review. (T. Bedford, Bull. of Hygiene, Vol.* 18, *No.* 2, *Feb.*, 1943, *pp.* 91-100.) (Bull. of War Med., Vol. 3, No. 7, March, 1943, p. 414.)
720	8967	G.B.	*Coal Fired Air Heaters for Workshops.* (Engineering, Vol. 153, No. 4,029, 2/4/43, pp. 277-278.)
			Scrap Salvage.
721	8352	G.B.	*Segregation of Scrap.* (Metal Industry, Vol. 62, No. 11, 12/3/43, p. 107.)
722	8403	G.B.	*Segregating Steel Scrap (Colour Aid).* (Engineer, Vol. 175, No. 4,549, 19/3/43, p. 240.)
723	8489	G.B.	*Keeping Down Scrap in the Foundry.* (Light Metals, Vol. 6, No. 61, Feb., 1943, pp. 90-95.)
724	8504	U.S.A. ...	*Conserving Aluminium Scrap.* (J. St. Peter, Aviation, Vol. 41, No. 5, May, 1942, pp. 99-101.)
			Road Transport.
			Tractors, Tankers, Trailers, etc.
725	8160	Germany ...	*Germany's Submersible Oil Supply Tanker.* (Petroleum Times, Vol. 47, No. 1,187, 23/1/42, p. 30.)
726	8161	G.B.	*Tanker of the Future.* (Petroleum Times, Vol. 47, No. 1,187, 23/1/43, pp. 32-35.)
727	8326	G.B.	*Cement Tipping Lorries.* (Engineering, Vol. 155, No. 4,025, 5/3/43, p. 190.)
728	8397	G.B.	*Tractor Bulldozer (Photo).* (Engineer, Vol. 175, No. 4,549, 19/3/43, p. 224.)
729	8452	U.S.A. ...	5,000 *Gallon Transport for Liquid Petroleum Gas (Photo).* (Ind. and Eng. Chem., Vol. 21, No. 3, 20/2/43, p. 188.)
730	8580	G.B.	*Vehicle Transmission (Collection of Abstracts).* (I.A.E. Report, No. 1,942-1,948.)

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731	8614	U.S.A. ...	*Propeller Trailer Aids, Servicing and Storage of Propellers.* (Am. Av., Vol. 222, No. 10, 15/10/42, p. 35.)
732	8772	Germany ...	*Trailer for Uncompressed Coal Gas.* (A.T.Z., Vol. 45, No. 24, 25/12/42, p. 673.)
			Testing and Repair.
733	8578	G.B.	*Salvage and Repair of Worn and Broken Vehicle Parts.* (W. S. Stevenson, I.A.E. Report, No. 1,941-1,948, Sept., 1941.)
734	8575	G.B.	*Overheating of Tyres and Brakes (Lab. Measurements).* (P. V. Lamarque, I.A.E. Report, No. 1,941-1,945, June, 1941.)
735	8771	Germany ...	*The Testing of Brake Inserts (Road and Laboratory Tests).* (O. M. Ritter, A.T.Z., Vol. 45, No. 23, 10/12/42, pp. 634-640.)
736	8770	Germany ...	*Brakes and Their Testing (Drum Band Combinations).* (B. Koessler, A.T.Z., Vol. 45, No. 23, 10/12/42, pp. 629-634.)
			Wireless and Electricity.
			Wireless (General).
737	8196	G.B.	*A High Gain Audio-Frequency Amplifier for the Investigation of Weak Signals.* (E. A. Rowlands and W. Burns, J. Sci. Instruments, Vol. 19, No. 6, June, 1942, pp. 85-88.)
738	8311	U.S.A. ...	*Calculation of Ground-Wave Field Intensity Over a Finitely Conducting Spherical Earth.* (K. A. Norton, Procs. I.R.E., Vol. 30, No. 12, Dec., 1942, pp. 623-629.)
739	8313	U.S.A. ...	*An Ultra-High Frequency Two-Course Radio Range for Aircraft Use with Sector Identification.* (A. Alford and A. G. Kandoian, Procs. I.R.E., Vol. 30, No. 12, Dec., 1942, p. 664.)
740	8321	U.S.A. ...	*Analysis of the Signal-to-Noise Ratio of Ultra-High Frequency Receivers.* (E. W. Herold, Procs. I.R.E., Vol. 30, No. 12, Dec., 1942, p. 665.)
741	8322	U.S.A. ...	*Direction Finding at Medium High Frequencies and the United Air Lines Ground Stations Direction Finder.* (P. C. Landretta and E. P. Buckthal, Vol. 30, No. 12, Dec., 1942, p. 665.)
742	8332	G.B.	*Experimental Demonstrations for Radio Training Classes. II—The Valve as an Amplifier.* (T. J. Dehfisch, Electronic Engineering, Vol. 15, No. 181, 8/3/43, pp. 426-429.)
743	8499	G.B.	*Some Problems in Transmission Line Design. (Abstract of Paper.)* (A. Burke, J. Inst. Elect. Engs., Vol. 90, Pt. 1, No. 27, March, 1943, pp. 137-139.)
744	8511	U.S.A. ...	*Aircraft Radio Shielding.* (Aviation, Vol. 41, No. 5, May, 1942, p. 177.)
745	8599	U.S.A. ...	*Operation of a Thyratron as a Rectifier.* (L. A. Ware, Procs. I.R.E., Vol. 30, No. 11, Nov., 1942, pp. 500-502.)

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746	8602	U.S.A. ...	*Radiation from Antennas.* (S. A. Shelkanoff and C. B. Feldman, Procs. I.R.E., Vol. 30, No. 11, Nov., 1942, pp. 511-516.)
747	8639	G.B.	*Reduction in Band Width in Frequency Modulation Receivers.* (D. A. Bell, Wireless Engineer, Vol. 19, No. 230, Nov., 1942, pp. 497-502.)
748	8640	G.B.	*Harmonic Distortion in Audio-Frequency Transformers* (3). (N. Partridge, Wireless Engineer, Vol. 19, No. 230, Nov., 1942, pp. 503-507.)
749	8816	G.B.	*Wireless Engineer.* (Index Abstracts and References for 1942.)
750	8826	G.B.	*Wireless Engineer Abstracts and References. Compiled by Radio Research Board.* (March, 1943.)
751	8925	G.B.	*"Wireless Engineer" Abstracts and References.* (April, 1943.)
			Short Waves.
752	8496	G.B.	*Design of Ultra Short Wave Field-Strength Measuring Equipment.* (F. M. Colebrook and A. A. Gordon Smith, J. Inst. Elect. Engs., Vol. 90, Pt. III, No. 9, March, 1943, pp. 28-32.)
753	8494	G.B.	*Study of Propagation Over the Ultra Short Wave Radio Link Between Guernsey and England.* (R. L. Smith-Rose and A. C. Strickland, J. Inst. Elect. Engs., Vol. 90, Pt. 3, No. 9, March, 1943, pp. 12-24.)
			Electricity and Magnetism.
754	8309	U.S.A. ...	*Distortion Tests by the Intermodulation Method.* (J. K. Hilliard, Procs. I.R.E., Vol. 30, No. 12, Dec., 1943, pp. 614-620.)
755	8497	G.B.	*Determination of the Electrical Properties of Soil at a Wave-Length of 5 Metres.* (J. S. McPetrie and J. A. Saxton, J. Inst. Elect. Engs., Vol. 90, Pt. 3, No. 9, March, 1943, pp. 33-35.)
756	8498	G.B.	*Eddy-Current Losses in Single Conductor Paper-Insulated Lead-Covered Unarmoured Cables of a Single-Phase System. (Abstract of Paper.)* (A. H. M. Arnold, J. Inst. Elect. Engs., Vol. 90, Pt. 1, No. 27, March, 1943, pp. 136-137.)
757	8588	G.B.	*Magnetic and Electro Magnetic Clutches and Couplings* (1930 *to date*). (Sci. Lib., Bibliog. Series, No. 580.)
758	8598	U.S.A. ...	*Proposed Standard Conventions for Expressing Elastic and Piezo Electric Properties of Right and Left Quartz.* (W. G. Cady and K. S. van Dyke, Proc. I.R.E., Vol. 30, No. 11, Nov., 1942, pp. 495-499.)
759	8600	U.S.A. ...	*The Q Metre and its Theory (Reactance/Resistance).* (V. V. L., Rad. Proc., I.R.E., Vol. 30, No. 11, Nov., 1942, pp. 502-505.)
760	8601	U.S.A. ...	*Some Aspects of Coupled and Resonant Circuits.* (J. B. Sherman, Procs. I.R.E., Vol. 30, No. 11, Nov., 1942, pp. 505-510.)

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761	8638	G.B.	*Current Distribution Along a Straight Wire in a Uniform Field.* (C. W. O. Howe, Wireless Engineer, Vol. 19, No. 230, Nov., 1942, pp. 495-497.)
762	8764	Germany ...	*What are the Results of Freezing the Electrolyte in Accumulator Batteries?* (E. Bleich, A.T.Z., Vol. 45, No. 23, 10/12/42, pp. 641-645.)
763	8957	G.B.	*Amplifying and Recording Technique in Electro Biology (Special Reference to the Brain).* (G. Parr and W. G. Walter, Elect. Eng., Vol. 15, No. 182, April, 1943, pp. 462-464 and 469.)
764	8958	G.B.	*Analysis of Period Wave Forms—III.* (K. Browne, Elect. Eng., Vol. 15, No. 182, April, 1943, pp. 472-474.)
765	8959	G.B.	*A Differential Electronic Stabiliser for Alternating Voltages (Digest).* (A. Glyne, Elect. Eng., Vol. 15, No. 182, April, 1943, pp. 482-483.)
766	8960	G.B.	*Electrical Strength of Freon-Nitrogen Mixtures.* (Elect. Eng., Vol. 15, No. 182, April, 1943, p. 483.)
767	8962	G.B.	*The Mechanism of Insulation Breakdown.* (T. F. Wall, Engineering, Vol. 153, No. 4,029, 2/4/43, pp. 261-262.)
			Heat and Light.
			Induction Heating, Flame Temperature, etc.
768	8184	Germany ...	*The Calculation of Flame Temperatures.* (J. C. Breinl and W. Lenz, Z.V.D.I., Vol. 85, No. 15, 15/3/41, pp. 259-264.)
769	8422	U.S.A. ...	*The Design of Cross-Flow Heat Exchangers.* (P. A. Scharer, Aero Digest, Vol. 42, No. 1, Jan., 1943, pp. 138-146, 251-254.)
770	8831	G.B.	*New Uses in Induction Heating.* (R. Legrand, Machinist, Vol. 86, No. 40, 16/1/43, pp. 1,079-1,081.)
771	8838	G.B.	*New Uses of Inductive Heating.* (R. Legrand, Machinist, Vol. 86, No. 42, 30/1/43, pp. 1,158-1,161.)
772	8860	Germany ...	*Thermometer Lag for Sudden, Periodic and Linear Temperature Variation.* (E. Eckert, Z.V.D.I., Vol. 85, No. 11, 15/3/41, pp. 272-273.)
			Black Light, Infra Red Rays.
773	8542	U.S.A. ...	*Map Reading by Invisible (Black Light).* (Sci. Am., Vol. 168, No. 1, Jan., 1943, p. 29.)
774	8920	G.B.	*Infra Red Lamp Heating.* (F. E. Rowland, Machinery, Vol. 62, No. 1,584, 18/2/42, pp. 187-188.)
			Meteorology.
			(Thunderstorms, Vapour Trails, etc.)
775	8221	G.B.	*Location of Thunderstorms by Radio Methods.* (Nature, Vol. 151, No. 3,827, 6/3/43, pp. 285-286.)
776	8729	U.S.A. ...	*Meteorological Characteristics of Thunderstorms.* (G. N. Brancato, Aviation, Vol. 41, No. 10, Oct., 1942, pp. 101-103, 292, 295, 299.)

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777	8257	U.S.A. ...	*The Stars for December.* (W. C. Youngclaus, Aero Digest, Vol. 41, No. 6, Dec., 1942, pp. 102-108 and 392.)
778	8829	Germany ...	*Approximate Vapour Pressure Calculations.* (J. Esser, Z.G.S.S., Vol. 38, No. 1, Jan., 1943, pp. 7-10.)
			Physiology.
			(*Altitude Testing, etc.*)
779	8225	Germany ...	*Research Institute of Aeronautical Medicine, Directed by German Air Ministry.* (Inter. Avia., No. 851, 12/1/43, p. 13.)
780	8333	G.B.	*The Encephalophone (for Observing the Potentials of the Human Brain).* (C. A. Beerers and R. Furth, Electronic Engineering, Vol. 15, No. 181, 8/3/43, pp. 426-429.)
781	8416	U.S.A. ...	*Oxygen Makes the Flier.* (F. Fupper, Aero Digest, Vol. 42, No. 1, Jan., 1943, pp. 88-90 and 256.)
782	8485	G.B.	*Portable Apparatus for Continuous Intravenous Anæsthesia or Blood Transfusion.* (A. L. Sims and Sq. Ldr. B. Lucas, J. Scientific Instruments, Vol. 19, No. 9, Sept., 1942, pp. 136-137.)
783	8803	G.B.	*Night Blindness.* (J. Barnet, Aeronautics, Vol. 8, No. 1, Feb., 1943, pp. 75-76.)
784	8932	Germany ...	*Stereoscopic Vision of Moving Objects.* (R. Kilches, Luftfahrtmedizin, Vol. 6, No. 2-3, 1942, pp. 119-126.) (Bull. of War Med., Vol. 3, No. 7, March, 1943, p. 412.)
785	8933	U.S.A. ...	*The Relation Between Dark Adaptation and the Level of Vitamin A in the Blood.* (C. Haig and A. J. Patek, J. Clinic Investigation, Vol. 21, No. 4, July, 1942, pp. 377-383.) (Bull. of War Med., Vol. 3, No. 7, March, 1943, p. 412.)
786	8934	France ...	*Effects of Sulphonamides in Airmen.* (G. F. Bonnett, Presse Med., 1942, Oct. 3, Vol. 50, No. 44, pp. 612-613.) (Bull. of War Med., Vol. 3, No. 7, March, 1943, p. 412.)
787	8938	Canada ...	*Aviation Med. in the Royal Canadian Air Force.* (G. E. Hall, J. Amer. Med. Ass., Vol. 119, No. 14, Aug. 1st, 1942, pp. 177-181.) (Bull. of War Med., Vol. 3, No. 7, March, 1943, pp. 408-409.)
788	8939	Germany ...	*New Results and Problems in Medical Stratosphere Research.* (H. Strughold, Luftwissen, Vol. 9, No. 6, June, 1942, pp. 177-181.) (R.T.P. Transl. No. 1,637.) (Bull. of War Med., Vol. 3, No. 7, March, 1943, p. 409.)
789	8940	U.S.A. ...	*The Effect on the Vital Capacity of a Swift Ascent to a Simulated Altitude of 35,000 feet.* (M. Eckman and A. L. Barach, J. Av. Med., Vol. 13, No. 1, 1942, pp. 30-42.) (Bull. of War Med., Vol. 7, March, 1943, p. 409.)
790	8941	Germany ...	*Pathogenic Effect of Anoxia in High Altitude Sickness.* (F. Buchner, Klin. Woch., Vol. 21, No. 33, Aug. 15th, 1942, pp. 721-725.) (Bull. of War Med., Vol. 3, No. 7, March, 1943, pp. 409-410.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
791	8942	Germany ...	*Training for High Altitudes.* (H. v. Diringshofen and H. Lottig, Luftfahrtmedizin, Vol. 6, No. 2-3, 1942, pp. 52-66.) (Bull. of War Med., Vol. 3, No. 7, March, 1943, p. 410.)
792	8943	Germany ...	*A New Method of Improving Human Altitude Tolerance in the Decompression Chamber.* (W. Blasius and E. Bauereisen, Luftfahrtmedizin, Vol. 6, No. 2-3, 1942, pp. 67-82.) (Bull. of War Med., Vol. 3, No. 7, March, 1943, p. 410.)
793	8944	Germany ...	*Effects of Respiration of Pure Oxygen at Ground Level.* (E. Heck, Luftfahrtmedizin, Vol. 6, No. 2-3, 1942, pp. 105-113.) (Bull. of War Med., Vol. 3, No. 7, March, 1943, pp. 410-411.)
794	8945	Germany ...	*The Effect of Breathing Oxygen at Normal Pressure on Performance.* (G. Lehmann and O. Grof, Luftfahrtmedizin, Vol. 6, No. 2-3, 1942, pp. 183-200.) (Bull. of War Med., Vol. 3, No. 7, March, 1943, p. 411.)
795	8946	Germany ...	*Investigations on Respiration of Low Ratio Oxygen-Nitrogen Mixture. Part I—Continuous Registration of Pulse Rate.* (W. Glock, Luftfahrtmedizin, Vol. 6, No. 2-3, 1942, pp. 201-212.) (Bull. of War Med., Vol. 3, No. 7, March, 1943, p. 411.)
796	8947	Germany ...	*The Determination of Altitude Tolerance by Respiration of Gas Mixtures.* (T. Benzinger and others, Luftfahrtmedizin, Vol. 6, No. 2-3, 1942, pp. 234-253.) (Bull. of War Med., Vol. 3, No. 7, March, 1943, p. 411.)
797	8948	U.S.A. ...	*The Rôle of the Adrenal Cortex in Acute Anoxia.* (R. A. Lewis and others, J. Clin. Investigation, Vol. 21, No. 1, Jan., 1942, pp. 33-46.) (Bull. of War Med., Vol. 3, No. 7, March, 1943, p. 411.)
798	8949	Germany ...	*The Position of the Respiratory Centre in the Arteriovenous CO_2 Gradient. (E. Heck and H. Loeschcke, Luftfahrtmedizin, Vol. 6, No. 2/3, 1942, pp. 183-200.)* (Bull. of War Med., Vol. 3, No. 7, March, 1943, pp. 410-411.)

Mathematics.

799	8183	Germany ...	*A Simple Method for Determining the c.g. of a Polygon.* (Z.V.D.I., Vol. 85, No. 15, 15/3/41, p. 258.)
800	8727	G.B.	*Coriolis Theorem.* (A. Block, Engineering, Vol. 155, No. 4,028, 26/3/42, pp. 242-243.)

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High Performance Fighters. (K. Tank, Luftwissen, Vol. 10, No. 4, April, 1943, pp. 99-102.) (112/1 Germany.)

The author, who is the designer of the well-known F.W.190 fighter, briefly enumerates the desirable qualities of such aircraft; maximum possible horizontal speed at all altitudes, very high rate of climb and ceiling, highest possible diving speed, excellent manœuvrability. All these desirable features should be combined in the smallest and lightest possible aircraft capable of housing the power plant and pilot, together with such essential equipment as fuel and armament.

It is well-known that it is impossible to incorporate optimum values for all these qualities in one and the same design: thus, high horizontal speed and high rate of climb necessarily imply differences in wing loading if optimum values are to be reached with a given power plant. At very high altitudes an increase in aspect ratio is beneficial, whilst manœuvrability generally goes with a small wing span.

Till quite recently, horizontal speed was given primary consideration. Every increase in output of power plant was utilized for this purpose, and the relatively poor rate of climb was accepted as a necessary price. Wing loadings were pushed to the limit rendering take-off and landing relatively difficult.

With the advent of the high altitude bomber, the need for a higher rate of climb for the fighter has become urgent, combats are taking place at ever-increasing altitude, and the aircraft with the higher ceiling has a very important advantage.

Whilst before everything was sacrificed for speed at relatively low altitudes, modern fighter design calls for a very careful compromise, unless, as is sometimes suggested, two separate fighter designs are developed.

The author has investigated this problem very fully and concludes that with careful design, optimum rate of climb and ceiling can be achieved for only a relatively small sacrifice in maximum horizontal speed, amounting to about 27 km./h. and 54 km./h. at supercharged heights of 6,000 m. and 12,000 m. respectively. On the other hand, the more lightly loaded aircraft has the advantage of 1,700 m. in ceiling and 3.7 m./sec. in rate of climb. As a matter of fact, the sacrifice in horizontal speed is likely to be less than 54 km./h. since the calculation neglects compressibility effects. (Such effects will be more pronounced for the heavily-loaded aircraft flying at the greater incidence.)

It is thus clear that for operation between 6,000 and 12,000 metres, the fighter should be designed primarily for maximum rate of climb, and its wing loading should not exceed about 150 kg./m.^{2}

Adequate strength of the structure is of primary importance, since compressibility effects may produce sudden changes in load distribution, especially during a

high-speed dive. This may not only reduce the efficacy of the control surfaces, but may actually lead to destruction of the wing. Several fatal accidents are attributed to this effect.

Modern physiological research has shown that under suitable conditions the pilot can withstand for a short period accelerations in excess of those corresponding to the standard load factors.

There is thus every inducement to increase the strength characteristics of modern designs and thus also allow for high-speed compressibility effects.

In conclusion, the author makes a plea for restricting the weight of equipment to the utmost. At 10,000 metres an increase of 1 per cent. in the dead weight of the aircraft will reduce its ceiling by about 65 m., whilst an increase of 1 per cent. in the h.p. will increase the ceiling by only 43 m.

Unfortunately, the high-altitude operation necessitates extra equipment such as oxygen for the pilot and heating for the guns. The power plant also becomes heavier, due to increased size of the supercharger and airscrew.

The problem calls for considerable ingenuity on the part of the designer and considerably more research on the flying qualities of aircraft at high altitudes is required, before the element of " luck " can be considered as ruled out in the final compromise solution.

A Close-up of the LAGG-3 Russian Fighter. (N. Hulten, Flyg och Motor, Vol. 21, No. 6-7, March-April, 1943, pp. 21-24, 25-27.) (Available as R.T.P. Translation No. 1,822.) (112/2 Sweden.)

This single-seater fighter has the wings, fuselage and tail plane made of wood. Rudder, aileron and elevator are made of light alloys and fabric covered, the wing flaps consisting of dural sheet. Dural sheeting also covers the fore part of the fuselage.

The following are the main characteristics:—

Length	9.0 m.
Span	9.7 m.
Wing area	17.5 m.^{2}
Weight empty	2,620 Kg.
Weight full	3,200 Kg.
Fuel capacity	550 litres
Wing loading	183 Kg./m.^{2}

The engine is a liquid-cooled 12-cylinder V, of 36 litre stroke volume, employing a boost pressure of about 4 lb. and rated at 1,000 h.p. at 4,000 m. The dry weight is 575 kg. A three-bladed variable pitch propeller weighing 132 kg. is fitted.

The armament consists of a 20 mm. cannon (firing through the propeller axis and weighing 40 kg.) and two 12.7 mm. machine guns weighing 25 kg. each. The rate of fire of cannon and machine guns is the same, 700-800 rounds a minute.

The short wave wireless equipment deserves mention. Transmitter and receiver only weigh 4½ lb. each.

Details of the construction of the wing and fuselage are given. Both are provided with a plywood covering. The spar flanges are made of compacted wood, plywood being utilised for the webs.

According to Finnish pilots, the aircraft goes into a spin when a sharp turn is attempted. Elevator control has evidently given the designer some trouble in this machine, since a heavy pendulum (weight 12 kg., arm 50 cm.) is fitted above the tail wheel.

Of special interest are the fragmentation bombs weighing 25 kg. each. Provision is made for carrying up to six of these bombs below the wing.

These bombs are provided with rocket propulsion, providing an additional speed of about 250 m./sec. and enabling the bomb to penetrate 150 mm. of armour plate.

The Effect of Atmospheric Haze on the Camouflaging of Aerial Targets. (F. Lohle, Luftwissen, Vol. 9, No. 9, Sept., 1942, pp. 258-262.) (112/3 Germany.)

The author considers the case of an aircraft hangar surrounded by trees.

A_z = Albedo of camouflage paint.
A_u = ,, surrounding foliage.

The contrast K is given by

$$K = \left(\frac{(A_z - A_u)}{A_u} \right)$$ *i.e.*, per cent. incident light flux diffusively reflected.

Since A_u depends on the season and may vary from 6 per cent. (winter) to 16 per cent. (spring), whilst A_z is necessarily constant (assumed 8 per cent.), K will vary from 33 per cent. (winter) to -50 per cent. (spring).

(A negative value for K indicates that the surroundings are lighter than the target.)

In the presence of atmospheric haze, a virtual albedo A_D is superposed, with the result that the contrast is reduced to a near value $K_1 = (A_z - A_u)/(A_u + A_D)$

$$= K \left(1 - \frac{1}{\{ 1 + A_u/A_D \}} \right) \quad . \quad . \quad . \quad . \quad . \quad (1)$$

$$= \rightarrow 0 \text{ if } A_D \gg A_u.$$

The value of A_D will depend on the thickness of the layer of haze and its density distribution between target and observer (turbidity of atmosphere).

For low altitude reconnaissance (*i.e.*, observation from 300 m. looking obliquely ahead) only the ground density of the haze is effective which is directly related to the range of horizontal vision " S."

The following table gives A_D for three target distances D under these circumstances :—

TABLE 1.

	S	5	10	25	50	100 km.
A_D D	1 km.	·54	·32	·14	·07	·04
	3 km.	·90	·69	·37	·21	·11
	10 km.	—	1.00	·79	·54	·32

For high altitude reconnaissance (view vertically downwards) A_D will depend on the height and density distribution of the haze.

Experiments have shown that the distribution is a function of the ground density and the type of weather, and since the ground density directly controls the range of horizontal vision near the ground it is again possible to tabulate A_D against S. This is done in the following table for two standard weather conditions for vertical vision from an altitude of 3,000 m.

TABLE 2.

S	5	10	25	50	100 km.
A_{D1}	·35	·25	·15	·09	·05
A_{D2}	·62	·42	·27	·18	·10

A_{D1} corresponds to particularly clear weather conditions (decreasing turbidity with altitude temperature inversion) whilst A_{D2} refers to bad weather with increasing turbidity and decreasing temperature with altitude.

A comparison of the two tables shows that A_D for 3,000 m. target distance is appreciably less for vertical than for oblique vision, with the result that the apparent contrast of a given target as calculated by equation (1) also differs in the two cases.

This is shown in the following table which gives K_1 as a function of S for a target distance of 3,000 m. $K = -.50$, $A_u = .16$.

TABLE 3.

	S	5	10	25	50	100 km.
K_1	(1)	−.08	−.10	−.15	−.22	−.30
	(2)	−.15	−.20	−.26	−.31	−.38
	(3)	−.10	−.13	−.18		

(1) Low altitude reconnaissance from 300 m., oblique via ahead.
(2) High altitude reconnaissance, decreasing turbidity } with altitude.
(3) High altitude reconnaissance, increasing turbidity }

In the case of low altitude reconnaissance, the horizontal range of vision on the ground must be at least 25 km. to ensure contrast of −.15 between target and surroundings. In the case of vertical vision, however, for the same final contrast, the ground haze can be considerably denser with a range of vision as low as 5 km. if the upper air is clear due to temperature inversion.

The question naturally arises how far K must be reached before the threshold value of the eye is passed and the target merges into the background. This limiting value depends on the angular dimensions of the target and its surface brightness, as well as on the adaptation of the eye, which latter factor is affected by the oxygen concentration and atmospheric pressure. Relatively few experimental data are available on this subject and further research is urgently wanted.

Of special interest are threshold contrast values during night reconnaissance either by moonlight or when using flares. The author estimates that a million candle power flare at a height of 1 km. will produce a surface brightness of the target of the order of 10^{-1} apostilb ($=10^{-1}/(\pi \times 10^4)$ Hefner candles per cm.^{2}). This will produce a threshold value $K=.15$, *i.e.*, only contrasts in excess of this value will be noticed by the eye, provided the angular dimensions of the target are of the order of 1°.

For smaller targets, the threshold value rapidly increases and reaches about .4 for 1/6°.

If the surface brightness of the target is increased to 1 apostilb ($\simeq$ 10 million candle power flare) the threshold contrast value is approximately halved.

When illuminated by the full moon, threshold values of the order $K_1=.3$ may be expected.

Assuming the limiting value of $K_1=.15$ under flare illumination, Table 3 shows that high altitude (3,000 m.) reconnaissance will reveal the target even under bad weather conditions provided $S > 13$ km.

For low altitude reconnaissance S would have to be > 25 km. for the same target distance (3 km.). As a matter of fact, due to fore-shortening, the target will present a smaller angle than the 1° assumed above and for this reason the target must be approached to within less than 2 km. even if the ground haze is slight ($s=25$ km.). Generally speaking, it is thus easier to protect a target by camouflage against a low flying than against a high flying aircraft.

The author finally touches on the great difficulties produced by shadows when camouflaging targets. Such shadows may multiply the contrast by about 1,000 and render recognition almost infallible unless special precautions in the geometrical shape of the target are adopted. Here again a sub-division of the target into smaller units sub-tending the minimum angle at the place of the observer is recommended.

A Comparison of Direct and Alternating Current Supply in Aircraft on the Basis of Danger of Electrocution. (H. H. Viehmann, Luftwissen, Vol. 9, No. 9, Sept., 1942, pp. 268-269.) (112/4 Germany.)

At the present time, most electrical supply systems on aircraft employ direct current, the voltage varying between 22 and 29 volts, depending on the state of charge of the accumulator battery.

As the electric power consumption is continuously increasing, the question naturally arises whether a change over to higher DC or AC voltage might not be

profitable. The author considers the case entirely from the point of view of danger of electrocution and gives an interesting review of the physiological aspects of the problem.

The electrical resistance of the human body is of the order of 1,000 ohm., but contact resistance at the skin may easily treble this value.

The danger to life depends on the amount of current passing through the muscles (especially those of the heart) and on whether the current is continuous or alternating. Continuous current is very much less dangerous and there is no evidence that a voltage below 140 v. has ever proved fatal even if the contact resistance is negligible. Under similar conditions, however, alternating voltages can be fatal if they exceed 35 volt.

Change in frequency of the alternations over the range 50 to 2,000 cycles/sec. does not appear to affect the danger appreciably whilst there is some evidence that an increase in frequency above 2,000 cycles/sec. reduces the risk. It has also been proved that heavy alternating currents exceeding 2½ to 3 A. are not fatal unless prolonged over one minute. Loss of consciousness however results, accompanied by severe burns at the skin. Currents of this order, produced by an AC voltage of 2,500 were originally employed by the American authorities in the electrocution of criminals. In the modern method, such currents are employed only for a few seconds to produce unconsciousness, after which the current is lowered to .25 A. (250 volts) when death results immediately by paralysis of the heart muscles, the high voltage previously applied having perforated the skin and thus removed the contact resistance.

If absolute safety from accidental electrocution is thus to be avoided in aircraft, the supply voltages must be kept below 140 DC and 35 AC respectively.

The author is, however, of the opinion that if necessary, voltage of the order of 180 DC and 42 AC could be employed with reasonable security.

The Rôle of Composite Aircraft in Comparison with Other Methods of Assisted Take-off. (W. Hoff, German Academy of Aeronautical Research, Report No. 1, 1942, pp. 1-35.) (112/5 Germany.)

The author briefly reviews possible methods for facilitating take-off of heavily loaded high-speed aircraft, beginning with design features inherent in the craft (high lift flaps, variable pitch propellers, low drag undercarriage).

Such features by themselves will not suffice and take-off runs of the order of 2,000 m. are not uncommon. This necessarily restricts the employment of such aircraft to specially selected fields. Numerous proposals have been put forward to overcome this difficulty. Inclined runways would be of great help but their dependence on prevailing wind conditions scarcely justifies the expense. Catapult starts date from the time of the Brothers Wright, but their design became very cumbersome when applied to machines weighing more than about 25 tons. The catapult constitutes essentially a moving platform of relatively short travel and must therefore operate with considerable acceleration. It has been proposed to attach the platform to a separate motorised vehicle which has sufficient engine power to accelerate to the necessary speed over a distance corresponding to the available take-off run. By employing a wide track and wheels of large diameter, sufficient stability can be assured even if the ground is not in first class condition. This scheme appears to have been worked out in detail in Germany, but it is not known whether it has actually been tried. The aircraft could be mounted on the platform with its undercarriage already retracted and this should prove very beneficial. Other possible schemes, such as tow rope starts with a winch on the ground or by employing an aircraft tug are also discussed. Considerable experience has been gained with these methods in the case of gliders. It is doubtful, however, whether they are feasible for really large machines.

Assisted take-off by means of auxiliary power plants such as rockets is mentioned, but no details are given.

The author then returns to the case of the moving platform starts and suggests that the employment of a second aircraft for this purpose instead of a ground vehicle would present certain advantages, the chief one being that the launching can take place at a safe altitude and closer to the target. Two possible solutions present themselves, depending on whether the aircraft to be launched is fixed above or below the aircraft serving as a carrier. Both schemes are investigated theoretically in some detail, the aircraft to be launched having the following characterestics:—

Weight	33.5 tons
Wing area	93 m.²
Horse-power	5,000
Wing loading	360 kg./m.²

Designed as a conventional monoplane, this machine would have a take-off run of about 2,000 m.

Various sizes of the mother aircraft are considered as will appear from the following table in which schemes (1) and (2) refer to the launched aircraft being above the parent, whilst (3) and (4) refer to the alternative position. A constant force of 1,675 kg. at separation of the two aircraft is assumed in each case:—

	Above.		Below.	
	1	2	3	4
Weight (tons)	22	11	33.5	17
Wing area (m.²)	186	186	233	233
Wing load kg./m.² ...	120	60	144	72
H.P.	5,000	1,250	7,500	1,250
Min. theoretical take-off (m.) of combination ...	460	570	490	550

It will be noted that under the assumed condition of a constant separating force, there is no very marked difference in the length of take-off runs, although the h.p. and weight of the carrier aircraft have been changed over wide limits.

The beneficial results of this method of launching are obvious, the original 2,000 m. having been cut down to 500-600 m.

Of special interest is the fact that the h.p. of the carrier can be cut down considerably without affecting the results provided the wing loading of the carrier is sufficiently low. This naturally suggests building the carrier in the form of an auxiliary wing attached to the other aircraft without any additional power plant. The lunching in this case would correspond to shedding this auxiliary wing.

The scheme with parent below the launched aircraft has been tried out in practice by Mayo. In this case a parent aircraft of more or less orthodox design, but suitably strengthened, can be employed. The attachment has to be carried out by means of a crane.

In the alternative scheme (parent above), the parent aircraft must be provided with a sufficiently high undercarriage that it can " step over " the second aircraft whilst the attachment is carried out on the ground. A crane will not be required but the design of the parent will require careful consideration. On the other hand this method of launching will present the important advantage of operating with greater safety at a lower dynamic pressure, since the launched aircraft can dive immediately after separation and thus gain in speed.

In the discussion following this lecture, the value of composite aircraft as a means of assisted take-off was queried, especially for weights in excess of the order of 30 tons such as are considered by the author. A more profitable line of development was considered to be the design of power plants capable of standing up to a 50 per cent. overload with safety during the take-off and subsequent climb (at least 30 minutes). Under such conditions, a take-off of the order of 1,200 m. should generally be possible for a 45-ton machine, and this can be cut down to well below 1,000 m. by the provision of efficient rockets. Methods of

take-off worthy of consideration must envisage the possibility of having to be applied to the large aircraft of the future (~ 100 tons) for which the composite method of launching will scarcely be feasible.

Some Experiments on the Increase in the Maximum Lift of an Aerofoil Undergoing a Change of Incidence at a Constant Angular Velocity. (N. Scheubel, German Academy of Aeronautical Research, Report No. 1, 1942, pp. 37-45.) (112/6 Germany.)

The maximum lift of an aerofoil is limited by the onset of separation of the flow. Now this phenomenon takes a certain time to develop, and if, during this period the incidence is still further increased, a higher lift corresponding to a greater incidence can be established for a short period. This phenomenon is of importance in connection with wing stressing in gusty weather and may also account for some of the high lift values occasionally observed during take-off and landing.

The effect of wing rotation on maximum lift was investigated experimentally by Kramer (Z.F.M., Vol. 23, pp. 185-189) as long ago as 1932, using a model aerofoil and a rotating wind stream, the lift force being recorded piezo-electrically. The increase in maximum lift coefficient varied practically linearly with angular speed, being represented by the equation

$$\Delta C_{L\max} = 2\,1\ (d\alpha/dt)/(l/v)$$

where α = angle of incidence in radians.
l = chord of aerofoil.
v = wind speed.

The experiments covered the range $(d\alpha/dt)\,(l/v)$ varying from 4×10^{-3} to 30×10^{-3}, corresponding to rates of change of α from 50 to 400°/sec.

The largest increase in the maximum lift coefficient observed was of the order of .7 units for an average Reynolds number of 250,000.

In 1937, attention was called to the same phenomena in N.A.C.A. Report No. 618 in connection with experiments on a small civil aircraft in the N.A.C.A. full-scale tunnel. A similar linear relationship between ΔC_L and angular velocity was found, the rate of increase being, however, considerably greater, *i.e.*,

$$\Delta C_{L\max} = 370\ (d\alpha/dt)\ (l/v).$$

On the other hand, in these experiments, $(d\alpha/dt)\,(l/v)$ only ranges from 0 to $.2 \times 10^{-3}$, so that the maximum rate of change of α was only of the order of .17°/sec. corresponding to an increase in the maximum lift coefficient of about .08.

In these experiments Re was of the order of 3×10^6. The large difference in the proportionality factor (nearly 20 to 1) in these two sets of experiments suggested further experiments covering the range of "reduced" angular velocities $(d\alpha/dt)\,(l/v)$ from 0 to 2.5×10^{-3} not previously investigated.

For this purpose the author carried out model experiments on a wing of 7 cm. chord, but unlike Kramer's tests in which the air stream was deflected whilst the wing was fixed, the model wing was suddenly deflected in a steady air stream, the lift being again recorded piezo-electrically.

Over the lower speed range (reduced angular velocity 0 to $.2 \times 10^{-3}$) the results were in satisfactory agreement with the American full-scale tests, showing a similar large rate of increase in $C_{L\max}$.

At higher speeds (reduced angular velocity $.6 \times 10^{-3}$ to 2×10^{-3}) the lower rate of increase shown by Kramer's tests was reproduced. Between $(d\alpha/dt)\,(l/v) = .2 \times 10^{-3}$ and $.6 \times 10^{-3}$ there occurs a transition region characterised by a steady drop in the proportionality factor.

The Reynolds number in these experiments was of the same order as that in Kramer's tests. ($Re = \sim 200{,}000$.)

It is proposed to repeat these experiments at higher Reynolds number and investigate whether the position of the transition region for the reduced angular

velocity is sensitive to the profile shape. In the discussion following the author's lecture, Prandtl expressed surprise at the large effects produced by relatively slow rates of change of α. Whilst the effect of high angular velocities can be satisfactorily explained by the inertia lag of separation of flow, the marked low speed effects, if confirmed, suggest change in the boundary layer characteristics. This phenomenon would probably be best investigated in the smoke tunnel.

The Activated Throw. (A. Proll, German Academy of Aeronautical Research, Report No. 1, 1942, pp. 47-62.) (112/7 Germany.)

The author defines as activated throw the projection of a mass at a high initial speed (e.g. by means of a catapult) and its subsequent motion when subjected to further acceleration by propulsive agencies attached to the body or to retardation under the influence of air forces.

The motion is considered to be determined essentially by the initial throw, the activations (i.e. propulsion or retardation) constituting a disturbance which is superposed on this fundamental trajectory.

Examples of such " activated " motions are furnished by:—

1. The early stages of the motions of an aircraft catapulted at an angle inclined to the horizontal.

2. The ejection of torpedoes from aircraft by means of an explosive charge.

3. The early stages of the motion of rockets released by catapult or fired from a mine thrower.

4. The motion of bombs released from aircraft and fitted with inherent propelling devices.

A strictly accurate solution for motions of this type is very difficult and approximations have generally to be introduced at some stage of the work.

The author suggests an alternative method in which the approximations are introduced at the start of the investigation. Depending on the nature of the problem, either the acceleration, velocity or distance are expressed as time functions which are suitably chosen to reproduce the general characteristics of the process and satisfy the boundary conditions. If, as is generally the case, we are only interested in the motion over a relatively short time, relatively simple expressions for the time functions can be obtained and the resulting expressions can be integrated without difficulty. (These simple time functions really represent the first term of the accurate series solution.) The author illustrates the method by means of two worked-out examples:—

(*a*) Inclined catapult start of an aircraft.
(*b*) Projectile trajectory subjected to air drag (high angle fire).

In the latter case, the results are in satisfactory agreement with those obtained by the standard methods, the labour involved, however, being considerably less.

The catapulted aircraft has the following characteristics:—

Weight	...	...	10 ton.
Wing loading	...	...	100 kg./m.^{2}
H.P.	...	...	3,500
Take-off speed	...	...	40 m./sec.

The catapult has a slope of 1 in 4 and the length of run is 20 m. The altitude of the launching point is thus 5 m. above ground. Assuming a launching speed of 30 m./sec. (acceleration 2.4 g. acting for 1.28 sec.), the aircraft will at first climb to an altitude of 9 m. at a horizontal distance of 34 m. During the subsequent drop in altitude, the speed will increase till take-off conditions (v=40 m./sec.) are reached at a distance of 126 m. from the launching point, the aircraft being thus at an altitude of 1 m. from the ground. Horizontal launching on the ground for the same length of catapult (20 m.) would require an acceleration of 4 g. acting for 1 sec.

It is interesting to note that the required launching speed diminishes rapidly with altitude of launching point. At an altitude of about 30 m., the initial launching speed would diminish to zero, i.e., the aircraft, if raised to the altitude by a lift and released, would gain the necessary take-off speed before it touched the ground.

Whilst such an altitude may not prove feasible in practice, the author suggests that a horizontal catapult, placed at an altitude of about 8 m. may be worthy of consideration.

Determination of the Lowest Natural Bending Frequency of Axial Flow Compressor Blades. (M. Schilhansl, German Academy of Aeronautical Research, Report No. 1, 1942, pp. 63-95.) (112/8 Germany.)

When designing an axial fan, the number of blades to be fitted is at first indeterminate, theory only indicating the total blade area required.

It is easily shown that for geometrically similar solid blades of the same length L, the hub stresses will be reduced if a large number of narrow blades are fitted. From the point of view of fan weight therefore, this arrangement should be adopted were it not for the fact that the narrower blades have a lower natural frequency and the danger of resonance with external disturbances is thus increased.

If the fan is used for a wind tunnel, disturbances occurring twice per revolution are not uncommon (effect of model wake) and the natural blade frequency (vibrations/minute) should therefore be above $2 \times$ r.p.m. at the maximum speed of operation.

The determination of the blade frequency in any special case is thus of importance. The effect of rotation is to produce an additional restoring force and the frequency of vibration is thus higher than when the fan is stationary. The connection between the two frequencies is given by

$$\lambda^2 = \lambda_0^2 + \phi\omega^2$$

where λ = circular bending frequency when rotating.
ω = angular velocity.
λ_0 = circular bending frequency with fan stationary.

Several methods for calculating λ_0 or λ are available, differing in relative accuracy and mathematical labour involved. Since obtaining λ_0 is generally much less laborious, the author suggests that this should first be carried out, the speed effect being allowed for separately by using an approximate expression for ϕ.

For this purpose, the author replaces the blade by a five-mass system and expresses the variation of the moment of inertia J along the radius by a power series in x (x = distance of section from a point situated halfway between hub and blade tip). Since a check calculation employing 10 masses produced only a negligible effect on λ_0, it is concluded that a five-mass distribution at $x/L = \pm .8$, $\pm .4$ and 0 will generally suffice (L = blade length).

For ϕ the approximate expression $\phi = 1 + r_1 (S/K)$ is suggested, where
r_1 = distance of blade root from centre of hub.
S and K = static and inertia moments respectively of complete blade about root.

S/K will, in general, lie between the limits $1.5/L$ (cylindrical rod) and $2/L$ (linear diminution of cross-section to zero value at tip).

Representative cases worked out by the author gave $S/K = 1.75$ and 1.54 respectively.

This expression for ϕ has been checked by carrying out the laborious determination of λ either by the Liebers or the Grammel method. Both these methods assume a deflection line satisfying the boundary conditions. By Rayleigh's principle, the true deflection line corresponds to a minimum value for the natural frequency and this forms the basis of Liebers' method. Grammel's method is

still more laborious, but of greater accuracy, a step by step integration being carried out with the help of certain auxiliary functions.

Since a change in blade design has only a relatively small effect on ϕ, the problem is to make λ_0 as large as possible.

It can be shown that for a given blade, λ_0^2 varies as

$$\left\{\frac{(EJ_0)}{(F_0L^4)}\right\}\left(\frac{g}{\gamma}\right)$$

where E = Young's modulus.
γ = density.
J_0 = max. moment of inertia of section.
F_0 = max. area of section.
L = blade length.

If we increase the number of blades z whilst maintaining L and total blade area constant, the blade width B will decrease. Now for geometrically similar sections, J_0 is proportional to B^4 whilst F varies as B^2. λ_0^2 will thus vary as B^2, *i.e.*, vary inversely as the number of blades z. High frequency thus means few blades, but, as already pointed out, this leads to an increase in the hub stresses.

A change of blade material may alter the ratio E/γ on which λ_0 depends.

Representative values are given below:—

Wood	...	...	1.67×10^8 cm.
Electron	...	...	2.50×10^8 ,,
Dural	...	...	2.59×10^8 ,,
Steel	...	...	2.68×10^8 ,,

For the same blade form, therefore, the three metals give about the same blade frequency, whilst that of wood is appreciably lower.

All the considerations so far have been based on solid sections.

If, however, hollow sections are considered, the ratio J/F, on which λ_0^2 depends, can be increased materially without change in blade size.

Thus for a solid circular section

$$J = \frac{\pi d^4}{64}, \quad F = \frac{\pi d^2}{4}, \quad J/F = \frac{d^2}{16}$$

For a thin circular ring we have of wall thickness s

$$J = \pi d^3 s/8$$

$$F = \pi d s \text{ and } J/F = d^2/8.$$

A change over to the hollow section will thus increase λ by about 40 per cent. In the case of rectangular sections, the corresponding increase is 70 per cent.

For a normal blade, therefore, an increase in bending frequency by about 50 per cent. can be expected by a change over from solid to hollow construction.

The Gussolite Process for the Low Temperature Welding of Cast Iron. (Welding Industry, Vol. 2, No. 5, June, 1934, pp. 163-165.) (112/9 Germany.)

Normal cast iron welding using silicated rods and flux has to be carried out at a temperature of about 1,300°C. and unless the process is carried out with considerable skill there is grave danger of the joint cracking during cooling after welding.

For this reason, so-called "bronze welding" is frequently adopted in which the cast iron parts are bonded by a layer of bronze, this necessitating only a temperature of about 900°C. The process is easy to work and there is practically no damage of subsequent cracking.

The bonding is, however, not very strong and due to the marked difference in thermal expansion of bronze and cast iron, bronze welded parts cannot be subjected to appreciable temperature cycles.

In the gussolite process, a special welding rod is employed, which melts at about 850°C. and penetrates deeply into the solid cast iron previously treated with

a special paste. The principal difference in the technique required for this process and ordinary cast iron welding is that the blow pipe is held as flat as possible, since the present metal does not require to be melted. Examples of repairs carried out by the gussolite process are described and illustrated. (Cylinder block, milling machine arm, guide rail on milling machine bedplate.)

It is claimed that the process has been approved by the Charlottenburgh Laboratory for testing Machine Tools.

No details on the composition of the rod and flux are given.

Note.—The gussolite process has lately been supplied to the reclamation of bomb components—see Machinery. July 2nd, 1942.

The Behaviour of Certain Structural Materials in the Tropics. (A.T.Z., Vol. 44, No. 12, 25/6/41, pp. 316-317.) (Translation No. 1,807.) (112/10 Germany.)

The article is mainly concerned with the electrical equipment of motor cars. The main difficulties appear to be due to moisture and dust. Sudden changes in temperature and atmospheric pressure in a tropical climate (hot and moist) may produce condensation of water in the interior of starters and generators even if the latter have been sealed against dust. The only remedy is the provision of proper ventilation, care being taken that the breather is fitted with an efficient dust filter. Even under these conditions starters and generators should be dismantled at frequent intervals and all traces of rust and mould removed. The same need for proper drainage and ventilation also applies to any internal parts of the car, if corrosion is to be minimised.

The use of tungsten as a contact material for relays, make and break, etc., in German equipment is likely to give trouble due to the formation of non-conducting film, if the car is laid up for any time. All such contacts should be cleaned before attempting to start up.

The storage of spares also requires considerable attention. Even if the parts are stable under tropical conditions, proper ventilation of the store must be provided. This applies especially to rubber. Unstable parts must be sealed up in tins after having been previously dried. It is most important to check such soldered tins periodically for leaks by immersing the tin in hot water (air bubbles!).

All bright iron parts must be protected with anti-rust oil. The same applies to electron, even if the material has already been subjected to anti-corrosion treatment. Die castings containing zinc should be avoided, but aluminium die castings, apart from suffering loss in appearance, are generally stable under tropical conditions.

In the case of soft rubber, only types definitely marked as stable must be used in the tropics.

Insulating tape containing linseed oil is unsuitable as it becomes sticky when hot. Only tape treated with natural asphalt should be used.

All fibre parts must be greased, and possible dimensional changes allowed for in its installation.

The same applies to laminated resin bushes using a fabric filler.

All leather parts must be greased to prevent mould.

The author is particularly insistent in the care and maintenance of transport vehicles being in skilled hands.

In the tropics, unskilled maintenance work is likely to do considerable harm.

Bending Fatigue Strength of Machined Crankshafts after Straightening, with Notes on the Stress Distribution Obtained by Extensometer and X-Ray Measurements. (R. Schmidt, Luftwissen, Vol. 9, No. 9, Sept., 1942, pp. 263-267.) (112/11 Germany.)

Forged crankshafts are subject to distortion after machining due to release of internal stresses. Subsequent straightening is usually carried out in a hydraulic press, the load being applied at the journal showing maximum deflection and the shaft supported symmetrically at two other journals. Under these conditions a

certain amount of plastic deformation takes place in the hollow chamfer forming the transition between crank pin or journal and web, leading to an inherent stress distribution in this locality which may reach considerable values and thus affect the bending fatigue strength of the throw. In order to elucidate this problem, the author carried out fatigue tests on twin throw crankshafts provided with a central and two end journals (central section of a six throw shaft). The shafts were made of heat treated steel with low Ni content conforming to German Flw. specification 1460.5 with an ultimate tensile of about 130 kg./mm.^{2} (83 tons per sq. in.), journal diameter 86 mm., pin diameter 78 mm., web thickness 19 mm., chamfer radius 5 mm.

The fatigue tests were carried out by supporting the shaft vertically from one end journal and applying a cyclic bending moment to the other end. The method of support was such as to ensure a constant bending moment over the shaft length at any instant, the cyclic variation being produced by a rotating out of balance mass, operating at 1,700 r.p.m., the whole system being just below resonance. The bending of the shaft was recorded optically and served as a measure of the moment applied, making use of a static calibration. The shafts were tested as received and after deformation in a hydraulic press, the centre bearing being deflected by amounts varying from .1 to .5 mm. with respect to the end journals.

In their original state, the shafts had a fatigue limit of $\pm$200 mkg., the final fracture occurring indiscriminately at one or other of the crank pin/web fillets. This cracking was clearly indicated by a sudden drop in the frequency of the system. Deformation in the press by the amounts indicated above reduced the fatigue strength by about 20 per cent. and the endurance limit at 50,000 cycles by 33 per cent. In this case cracks only developed in the two crank pin/web fillets adjacent to the central web, *i.e.*, in the regions which had been plastically deformed during the bending process. It is interesting to note that all the observations fall on one Wöhler curve, irrespective of the amount of original deformation. This seems to indicate that the inherent stresses set up by plastic deformation and thus producing a preloading of the shaft tend to a limit as the deflection is increased.

Before investigating this matter further, the author investigated the stress distribution in the crank pin/web and journal/web chamfer as well as across the web under elastic deformation corresponding to a bending moment at 130 mkg.

The extensions were measured by means of an optical extensometer of the Martens type with a base length of 1.5 mm. carried in a special frame enabling readings to be taken in any azimuth, including the chamfer region. Attention was specially paid to a line coinciding with the ultimate fatigue crack across the web and crankpin/web chamfer. For each measuring point on this line both principal extensions were recorded, i.e. maximum extension at right angles and lateral extension along the line. From these extensions the principal stresses σ_1 and σ_2 were calculated as well as the plane surface stress

$$\sigma_g = \sqrt{\sigma_1^2 - \sigma_1\sigma_2 + \sigma_2^2}$$

which serves as a measure of the amount of deformation work. The results show that σ_g agrees very nearly with $\epsilon_{max} \cdot E$, when ϵ_{max} = maximum extension in chamfer region and E = Young's modulus of material. Under the condition of these experiments therefore, the maximum extension is a measure of the bending load in the chamfer region of the shaft.

The results show that σ_g reaches a maximum value of app. 40 kg./mm.^{2} in this region, whilst the stress at the edge of the web is only about 10 kg./mm.^{2}

The nominal stress in the web for this particular bending moment (130 mkg.) is 14.8 kg./mm.^{2} and the form factor is thus of the order of three for this particular design.

Such a large stress concentration when the shaft is still deformed elastically must necessarily give rise to equivalent inherent stresses in the chamfered region when the shaft is bent plastically.

The presence of these stresses was confirmed by X-ray diffraction, making use of the Glocker method of stress analysis.

The photographs show maximum inherent stresses in the chamfer region of the order of 66 kg./mm.^{2} after the shaft had been deformed plastically so as to produce a deflection of .05 mm. of the central journal with respect to the shaft ends.

From fatigue investigations made on the crankshaft material, it appears that a preloading of the order of 66 kg./mm.^{2} should reduce the fatigue strength by about 40 per cent. This, of course, assumes that the induced plastic stresses maintain their original value during the fatigue period. Since the actual shafts after plastic deformation only showed a reduction of 20 per cent. in the fatigue strength, it appears probable that the inherent plastic stresses originally present will tend to equalise with fatigue time and this was confirmed by repeating the X-ray investigation on the deformed shaft after it had undergone 500,000 stress cycles. The inherent stresses now amounted to only 50 per cent. of the original value and would ultimately only cause a reduction in the fatigue strength by 20 per cent.

This is in satisfactory agreement with the experimental values and thus definitely proves that the inherent stresses due to plastic deformations are responsible for the drop.

The larger percentage reduction in the endurance of the deformed shaft are thus also accounted for. During the relatively short life under increased load (50,000 cycles) the inherent plastic stresses did not have time for equalisation.

It thus appears that the method of straightening a shaft in a press is definitely injurious to the material and should not be adopted.

As an alternative the author recommends carrying out the straightening process by hammering the sides of the web facing the crankpin. This causes a distortion of the web of the requisite amount without introducing inherent stresses in the chamfered region.

The absence of such stresses after deformation by this method was confirmed by X-ray diffraction measurements and such shafts when tested under fatigue gave identical results with those for undeformed shafts.

The hammering can be carried out neatly with a compressed air tool, using a very flat head (20 mm. radius), and this method of straightening is strongly recommended as it does not injure the material.

Strength Characteristic of Some Wooden Structural Elements Taken from Captured Russian Aircraft. (J. Theiner, Luftwissen, Vol. 10, No. 4, April, 1943, pp. 103-104.) (112/12 Germany.)

The elements tested were taken from three types of single-seat Russian fighters: LAGG-3, MIG-3 and JAK-1.

The former is built entirely of wood whilst the other two are of a mixed construction.

All three machines have a cruising speed of about 450 km./h. and a maximum speed of the order of 600 km./h.

The wing loading of the JAK-1 is rather low; 155 kg. m^2, that of the two other types about 185 kg./m.^{2}

The tests covered the wing structures of all three types. In the case of the MIG-3, the fuselage cover was also investigated.

The wing spans of the LAGG-3 and MIG-3 were made of beech (plywood or compressed veneers), the ribs and stringers of spruce.

The spar flanges of the JAK-1 are composed of numerous individual slats of spruce which are glued together. The shell fuselage of this aircraft is built up by criss-cross glueing of strips of veneer, each .5 mm. thick and 200 mm. wide, the number of superimposed layers depending on the thickness required.

The strength characteristics of the various samples are given tabular form and are stated by the author to fall mainly within the range of the values laid down in the German strength specification.

The values obtained for the LAGG-3 are, however, much higher and are considered exceptionally good. This is illustrated in the following table for compacted beech consisting of 13 layers of veneer, each 3 mm. thick and treated with phenol formaldehyde resin.

Ultimate tensile (average) ...	2,500 kg./cm.^{2}	($E = 326 \times 10^3$ kg./cm.^{2})
Density	1.34 gr./cm.^{3}	
Max. compression strength average value parallel to layer in direction of longitudinal fibre	2,100 kg./cm.^{2}	
Max. bending strength average value perpendicular to layer	2,900 kg./cm.^{2}	($E = 300 \times 10^3$ kg./cm.^{2})

The density of this compacted wood is about double that of ordinary ply, whilst its tensile strength is increased nearly three times.

The Experimental Determination of the Blade Temperature of Gas Turbines Under Load. (T. Benzinger, Luftwissen, Vol. 10, No. 4, April, 1943, pp. 110-113.) (112/13 Germany.)

In the usual determination of blade temperature, a thermocouple is used, the current being led off by means of slip rings. In order to rule out variations in contact resistance, a null method must be employed. Instead of utilising a separate circuit for this purpose, the author employs the neat alternative of worming up the rotating cold junction by enclosing it in an electric heating coil and recording the compensation temperature by means of an ordinary mercury thermometer.

The slip rings were made of copper, the brushes consisting of a copper wire working in conjunction with a graphite block which provides the necessary lubrication. It is stated that the wear is very small and has worked satisfactorily at speeds up to 24,000 r.p.m.

Since, up to now, contacts of this type have always been under a certain amount of suspicion when operating at such high speeds, an alternative method of transmitting the EMF by induction and without slip rings was developed. In this case, the current induced in a secondary coil surrounding the rotating leads is further amplified by means of a resistance/capacity valve circuit and finally recorded by means of a cathode ray oscillograph. Development of this instrument proved very troublesome at first due to eddy currents induced by the earth's magnetic field and remanence of the shaft ball-bearings. This was finally overcome by employing a rotor made of plastic and adopting an efficient metal shield against the ball-bearing effects.

The results obtained with this alternative method of transmission are in satisfactory agreement with those obtained with slip rings and the simpler method can therefore be used without fear of serious error for tests of this type.

It is, however, conceivable that the more complicated induction transmission will be necessary if the experimental lay-out is such that very high rubbing speeds at the contacts cannot be avoided.

The article gives some examples of exhaust turbine blade temperatures obtained by this method. The turbine utilised air cooling of the blades by means of interposed nozzles.

For an exhaust temperature of 825°C. in front of the nozzle, temperatures at the leading edge varied from 450°C. (front of blade) to 520°C. (halfway to top). These results were obtained at 2,400 r.p.m. At 15,000 r.p.m., these values increased from 500°C. to 580°C. respectively due to the reduced cooling effect.

The Scientific Basis for Height Tolerance Tests by Means of Breathing Definite Gas Mixtures. (Th. Benzinger, Luftfahrtmedizin, Vol. 6, No. 2-3, pp. 234-253, April, 1942.) (112/14 Germany.)

The decompression chamber is generally employed to assess flying fitness at high altitude and as a means of training altitude fliers to recognise symptoms of altitude sickness which come on unbeknown to the pilot and, if not dealt with immediately, may lead to serious injuries. The forbidding cost of such apparatus and the need to cope with increasing numbers of trainees have prompted the authors of this paper to investigate the possibilities of using simpler methods for simulating altitude conditions. For this purpose a mixture of air and nitrogen is used, the pressure and oxygen content of this mixture being so adjusted as to correspond with conditions obtaining at any required altitude. The ordinary oxygen breathing apparatus or Douglas bag (with certain modifications in design to ensure maximum safety) may be used for administering the oxygen-nitrogen mixture.

In the present study, 300 fliers were tested in this manner at a simulated altitude of 8,000 m. The reactions of the subjects were carefully studied under such headings as general physical well-being, respiration, pulse rate, blood pressure and electro-cardiogram.

Of interest was the fact that out of 300 subjects tested only 10 disclosed serious circulatory disturbances, nine of whom showed a clearly defined symptomology manifested by a sudden drop in the heart rate, decrease in blood pressure, pallor of skin and, prior to loss of consciousness, a return to normal electrocardiogram. The authors advance the theory that this complex of symptoms may be attributed to the excitation of the vogus nerve.

Parachute Descent and Time-Reserve at Great Heights. (O. Gauer and others, Luftfahrtmedizin, Vol. 6, No. 4, July, 1942, pp. 340-355.) (112/15 Germany.)

Altitudes above 10,000 m. have now become actual zones of operation. The problem of parachute descents from such heights is thus of vital importance. From previous investigations it has been found that the interruption of oxygen supply at an average altitude of 7,000 m. may lead to serious consequences. Four significant stages in the physiological effects of altitude have been noted:—

1. The reaction threshold at approximately 2,000-3,000 m.
2. The disturbance threshold at 4,000-5,000 m.
3. The critical threshold at roughly 6,000-8,000 m.

and finally

4. The lethal threshold which is function of time after the critical threshold has been passed.

This paper deals specifically with the two intermediate stages—the disturbance and critical thresholds. The latter is reached when the subject is incapable of writing and shows rapid decline of muscular control.

On the basis of tests carried out in the decompression chamber it has been shown that when the oxygen supply is interrupted, the time-reserve at 7,000 m. is approximately 5 min., at 8,000 m. 2½ min., at 9,000 m. 1½ min., and at 10,000 m. almost 1 min., and at 12,000 m. approximately 30 sec. How far these time-reserve values will apply when the altitude level is continuously changing as in the case of parachute descent is the subject of this paper.

Diagrams and tables are given showing the times of fall with and without parachute opening from altitudes ranging from 12,000-6,000 m., and the time-reserve available before efficiency becomes impaired. In these tests the descents with open parachute were simulated in the decompression chamber with the subjects at rest in the sitting position and at room temperature.

It is shown that 9,000 m. is a critical height for parachute descent from aircraft. Above this height serious symptoms of anoxia occur, particularly at altitudes above 10,000 m., when loss of consciousness and even death may occur. Almost complete recovery from anoxic symptoms occurred on reaching an altitude level of 7,000 m. The dangers of anoxia when making descents from an altitude of 10,000 m. may be considerably reduced by taking deep breaths of oxygen immediately before descent and holding the breath. The possibility of adopting this procedure when making descents from high altitudes is not considered practicable owing to the danger of even slight anoxia, disabling the pilot from pulling the rip-cord.

LIST OF SELECTED TRANSLATIONS.

No. 58.

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THEORY AND PRACTICE OF WARFARE.

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1785	——	*Development of the He. 111 Bomber.* (Motorschau, Vol. 6, No. 8, Aug., 1942, pp. 331-334.)
1799	Donatsch, H. ...	*Possible Evasive Manœuvres of Aircraft Under A.A. Fire.* (Flugwehr and Tech., Vol. 4, No. 7, July, 1942, pp. 171-176.)

SUPERSONICS.

1776	Sauer, R.	*Geometrical Relationship Between Two-Dimensional Fields of Compressible Flow.* (Z.A.M.M., Vol. 21, No. 5, October, 1941, pp. 312-315.)
1778	Guderley, G. ...	*Powerful Spherical and Cylindrical Compression Shocks in the Neighbourhood of the Centre of the Sphere and of the Cylinder Axis.* (L.F.F., Vol. 19, No. 9, 20/10/42, pp. 302-312.)

HIGH ALTITUDE FLYING.

1769	Kovalev, J. A. ...	*High Altitude Aircraft.* (Civil Av., U.S.S.R., Vol. 8, No. 6, June, 1938, pp. 39-41.)
1771	Streltxov, V. V. ...	*Stratosphere Flying.* (Civil Av., U.S.S.R., Vol. 9, No. 3, March, 1939, pp. 17-18.)
1775	Apollonev, A. P. ...	*High Altitude Flying from the Aspect of Safety.* (Air Fleet News, U.S.S.R., Vol. 21, No. 10, Oct., 1938, pp. 43-47.)

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1770	Jendrassik, G. ...	*The Jendrassik Gas Turbine.* (Z.V.D.I., Vol. 83, No. 26, 1/7/39, pp. 792-793.)
1773	——	*Valve Timing for Radial Engines* (*Patent* 696,742 *B.M.W.*). (Der Flieger, Vol. 20, No. 9, Sept., 1941, p. 302.)
1774	——	*Twin-Engine Mounting* (*Patent* 696,741, *Daimler Benz*). (Der Flieger, Vol. 20, No. 9, Sept., 1941, p. 302.)

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1768	Fredenhagen, K. ... Tramitz, E.	*Do all Systems Approach Raoults' Law with Increasing Dilutions?* (Koll. Zeit., Vol. 99, No. 3, June, 1942, pp. 283-290.)
1772	Wiegard, H. ...	*Effect of Surface Treatment on Fatigue Strength.* (Handbook published by B.M.W., Flugmotorenbau, 1940.)
1790	Uggla, W. R. ...	*The Hertzian and the Hydraulic Pressure on Gear Teeth.* (Teknish, Tidskrift, Vol. 69, No. 3, 21/1/1939, pp. 8-11.)

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1777	Lyrieleis, W. ...	*Dazzle and Dazzle Control in the Dark.* (Luftfahrtmedizin, Vol. 2, 1/2/1938.)
1779	Pohl, R. W. ...	*Some New Optical Investigations.* (Schriften Akademie der Luftfahrtforschung, No. 8.)

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1787	Freise, H.	*Novel Scratch Recorders for Aeronautical Research.* (L.F.F., Vol. 14, No. 8, 20/8/37, pp. 373-376.)
1794	Keller, H.	*Flexible Piezo-Electric Strips as Electro-Mechanical Records.* (H.F.T., Vol. 60, No. 1, July, 1942, pp. 5-10.)

Wireless and Electricity.

1781	Otpushtshenikov, N. F.	*Barkkhausen-Kurtz Oscillations in a "Free Anode" Circuit.* (J. Tech. Physics, U.S.S.R., Vol. 9, No. 1, 1939, pp. 32-38.)
1782	Schulz	*Welded and Soldered Joints for Electric Telephone Cables (Digest).* (E.T.Z., Vol. 63, No. 31-32, 13/8/42, p. 376.)

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18	9656	U.S.A. ...	*Aerial Gunnery Training.* (Army Ordnance, Vol. 24, No. 136, Jan.-Feb., 1943, pp. 118-119.)
19	9672	Norway ...	*Norway's Air Force.* (Flight, Vol. 43, No. 1,785, 11/3/43, p. 262.)
20	9694	G.B.	*Coastal Command, West Africa.* (Flight, Vol. 43, No. 1,791, 22/4/43, pp. 420-421.)
21	9682	G.B.	*Training the Aircraft Engineer.* (J. L. Pritchard, Flight, Vol. 43, No. 1,785, 11/3/43, pp. 263-264.)
22	9688	G.B.	*Reorganisation of Allied Air Forces in the Mediterranean Area.* (Flight, Vol. 43, No. 1,791, 22/4/43, p. 411.)
23	8993	U.S.A. ...	*Roller Used to Pack Snow at Airport (Photograph).* (Engineering News Record, Vol. 128, No. 6, 5/2/42, p. 13.)
24	9161	G.B.	*North African Runways (Wire and Matting Surfaces).* (Flight, Vol. 43, No. 1,789, 8/4/43, p. 367.)
25	9348	U.S.A. ...	*Repair and Maintenance in the R.A.F.* (J. L. Waddington, Aero Digest, Vol. 42, No. 2, pp. 101-104, 305-306, 347, Feb., 1943.)
26	*9428	U.S.A. ...	*Removing Snow from Runways.* (R. W. Hunt, Aviation, Vol. 42, No. 1, pp. 98-99, 263, 332-342, Jan., 1943.)

* Abstract available.

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27	9447	U.S.A. ...	*Flight Strips.* (Aviation, Vol. 42, No. 1, pp. 247-249, 324-332, Jan. 1943.)
28	9487	Canada ...	*Winter Airfields in Canada (Maintenance of Runways) (Photographs).* (Flight, Vol. 43, No. 1,792, 29/4/43, pp. 452-453.)
29	9489	U.S.A. ...	*Flight Strips Used on North African Airfields (Photograph).* (Flight, Vol. 43, No. 1,792, 29/4/43, p. 458.)
30	9568	G.B.	*The Lateral Pressure of Sand.* (A. A. Fordham, Engineering, Vol. 155, No. 4,033, 30/4/43, p. 341.)
31	9573	G.B.	*Machinery for Land Drainage.* (Engineering, Vol. 155, No. 4,033, 30/4/43, pp. 356-357.)
32	9608	Germany ...	*Tunisian and Sicilian Aerodromes Used by Axis Air Forces.* (Aeroplane, Vol. 64, No. 1,665, pp. 468-469, 23/4/43.)
			Military Types of Aircraft (British).
33	9004	G.B.	*British Night Bombers (Photograph).* (Luftwelt, Vol. 10, No. 4, 15/2/43, pp. 70-71.)
34	9138	G.B.	*Sunderland III (Photograph).* (Flight, Vol. 43, No. 1,790, 15/4/43, p. 380.)
35	9175	G.B.	*The Hawker Hurricane IIc (Recognition Details).* (Aeroplane, Vol. 64, No. 1,663, 9/4/43, pp. 422-423.)
36	9177	G.B.	*Wellington III (Photograph).* (Aeroplane, Vol. 64, No. 1,663, 9/4/43, p. 426.)
37	9188	G.B.	*The Wellington III.* (Trade and Engineering Times, Vol. 52, No. 949, March, 1943, p. 32.)
38	9199	G.B.	*De Havilland Mosquito.* (Trade and Engineering Times, Vol. 52, No. 948, Feb., 1943, p. 33.)
39	9475	G.B.	*The Typhoon 1a and 1b (Recognition Details).* (Flight, Vol. 43, No. 1,792, 29/4/43, pp. 440-441.)
40	9476	G.B.	*The Hurricane (Latest Versions) on all Battle Fronts (Photographs).* (Flight, Vol. 43, No. 1,792, 29/4/43, pp. 442-444.)
41	9477	G.B.	*A Westland Wapiti of the Indian Air Force for Target Towing (Photograph).* (Flight, Vol. 43, No. 1,792, 29/4/43, p. 444.)
42	9582	G.B.	*Britain's Newest Spitfire (Photograph).* (Canadian Aviation, Vol. 16, No. 2, Feb., 1943, p. 82.)
43	9607	G.B.	*Hurricane IID Tank Buster (Photograph).* (Aeroplane, Vol. 64, No. 1,665, p. 467, 23/4/43.)
44	9610	G.B.	*Squadron of Supermarine Spitfire VBS on Portable Runways (Photograph).* (Aeroplane, Vol. 64, No. 1,665, p. 469, 23/4/43.)
45	9613	G.B./ Germany ...	*Whitworth Whitley V and Arado Ar. 196 As. in Combat (Photograph).* (Aeroplane, Vol. 64, No. 1,665, p. 474, 23/4/43.)
46	9616	G.B.	*Armstrong Whitworth Whitley V (Recog. Details).* (Aeroplane, Vol. 64, No. 1,665, p. 481, 23/4/43.)
47	9704	G.B.	*The Avro-Lancaster.* (M. W. Bourdon, Autom. Ind., Vol. 87, No. 6, 15/9/42, pp. 18-19.)

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48	9740	U.S.A./G.B.	*Lockheed "Lightning" and British "Spitfire" (Photo).* (Canadian Aviation, Vol. 151, No. 8, Aug., 1942, p. 40.)
49	9760	G.B.	*Avro Lancaster I (Sectional Drawing).* (Autom. Ind., Vol. 87, No. 12, 15/12/42, pp. 30-31.)
		Military	*Types of Aircraft (American).*
50	8982	U.S.A. ...	*The New Martin "Mariner" (Photograph).* (U.S. Air Services, Vol. 28, No. 1, Jan., 1943, p. 30.)
51	9141	U.S.A. ...	*The Grumman Avenger (Photo).* (Flight, Vol. 43, No. 1,790, 15/4/43, p. 392.)
52	9143	U.S.A. ...	*Curtiss Owl (Recognition Details).* (Flight, Vol. 43, No. 1,790, 15/4/43, p. b.)
53	9156	U.S.A. ...	*American Aeroplanes in Service—X (Recognition Details).* (Aeroplane, Vol. 64, No. 1,664, 16/4/43, p. 459.)
54	9159	U.S.A. ...	*Douglas Dakota (Douglas D.C. 3) (Recognition Details).* (Flight, Vol. 43, No. 1,789, 8/4/43, p. A.)
55	9174	U.S.A. ...	*The Curtiss P-40—The Warhawk (Recognition Details).* (Aeroplane, Vol. 64, No. 1,663, 9/4/43, pp. 422-423.)
56	9187	U.S.A. ...	*The Barracuda.* (Trade and Engineering Times, Vol. 52, No. 949, March, 1943, p. 32.)
57	9205	U.S.A. ...	*North American B-25.* (Trade Winds, Feb., 1943, pp. 6-7.)
58	9216	U.S.A. ...	*Martin Mariner P.B.M.-3 (Photograph)* (Flying and Pop. Aviation, Vol. 32, No. 2, Feb., 1943, p. 54.)
59	9217	U.S.A. ...	*Consolidated P.B. 27-2 "Coronado" (Photograph).* (Flying and Pop. Aviation, Vol. 32, No. 2, Feb., 1943, p. 54.)
60	9218	U.S.A. ...	*New Single-Seat Fighter—Corsair (F4U) (Photograph).* (Flying and Pop. Aviation, Vol. 32, No. 2, Feb., 1943, p. 58.)
61	9355	U.S.A. ...	*Boeing 17F Flying Fortress.* (Aero Digest, Vol. 42, No. 2, p. 155, Feb., 1943.)
62	9430	U.S.A. ...	*Lockheed P. 38.* (Aviation, Vol. 42, No. 1, pp. 101, 369, Jan., 1943.)
63	9470	U.S.A. ...	*Martin Marauder (B. 26) (Photograph).* (Flight, Vol. 43, No. 1,792, 29/4/43, p. 435.)
64	9471	U.S.A. ...	*Vultee Vigilant Taking Off (Photograph).* (Flight, Vol. 43, No. 1,792, 29/4/43, p. 437.)
65	9472	U.S.A. ...	*North American Mustang (P-51) (Photograph).* (Flight, Vol. 43, No. 1,792, 29/4/43, p. 438.)
66	9544	U.S.A. ...	*Martin Marauder (Photo).* (Flight, Vol. 43, No. 1,786, 18/3/43, p. 273.)
67	9545	U.S.A. ...	*North American B-25 (Mitchell).* (Flight, Vol. 43, No. 1,786, 18/3/43, p. 275.)
68	9552	U.S.A. ...	*Vought Sikorsky "Corsair" (Recog. Details).* (Flight, Vol. 43, No. 1,786, 18/3/43, p. a.)
69	9555	U.S.A. ...	*U.S. Army's Helldiver (A-25).* (Flight, Vol. 43, No. 1,786, 18/3/43, p. 286.)

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70	9559	U.S.A. ...	*Vega Ventura Bomber.* (Engineer, Vol. 175, No. 4,555, 30/4/43, p. 341.)
71	9590	U.S.A. ...	*The Grumman TBF-1 Releasing Torpedo (Photograph).* (Canadian Aviation, Vol. 16, No. 2, Feb., 1943, p. 116.)
72	9600	U.S.A. ...	*Lockheed Lightnings Fly to Britain.* (Flight, Vol. 43, No. 1,791, 22/4/43, p. 423.)
73	9606	U.S.A. ...	*North American A-36 (Photo).* (Aeroplane, Vol. 64, No. 1,665, p. 466, 23/4/43.)
74	9614	U.S.A. ...	*American Aeroplanes in Service--XI (Drawings).* (Aeroplane, Vol. 64, No. 1,665, p. 475, 23/4/43.)
75	9628	U.S.A. ...	*Identification Table of American Military Aircraft.* (Aeroplane, Vol. 64, No. 1,658, 5/3/43, p. 265.)
76	9639	U.S.A. ...	*American Aeroplanes in Service—VI (Recog. Details).* (Aeroplane, Vol. 64, No. 1,658, 5/3/43, p. 278.)
77	9670	U.S.A. ...	*Formation of Lockheed Lightnings (Photograph).* (Flight, Vol. 43, No. 1,785, 11/3/43, p. 250.)
78	9687	U.S.A. ...	*Vought-Sikorsky F4U-1 Corsair (Photo).* (Flight, Vol. 43, No. 1,791, p. 408, 22/4/43.)
79	9689	U.S.A. ...	*Sikorsky Helicopter for Landing or picking up Men in Enemy Territory (Photo).* (Flight, Vol. 43, No. 1,791, 22/4/43, p. 412.)
80	9692	U.S.A. ...	*Taylorcraft Auster (L-57) (Recog. Details).* (Flight, Vol. 43, No. 1,791, 22/4/43, p. a.)
81	9693	U.S.A. ...	*Vultee "Vigilant" (O-49A) (Recog. Details).* (Flight, Vol. 43, No. 1,791, 22/4/43, p. b.)
82	9744	U.S.A. ...	*Flying Fortress in U.S. Army Air Forces (Photo).* (Canadian Aviation, Vol. 15, No. 8, Aug., 1942, p. 94.)
			Military Types of Aircraft (Russian).
83	9149	U.S.S.R. ...	*Russian IL-2 Stormovik Laying a Smoke Screen (Photo).* (Aeroplane, Vol. 64, No. 1,664, 16/4/43, p. 441.)
84	9546	U.S.S.R. ...	*P.E. 2 and Stormovik.* (Flight, Vol. 43, No. 1,786, 18/3/43, pp. 276-277.)
			Military Types of Aircraft (German).
85	8997	Germany ...	*A Test Flight on Arado 196 (Float Plane).* (R. Otte, Motor Schau, Vol. 7, No. 1, Jan., 1942, pp. 26-27.)
86	9142	Germany ...	*Focke-Wulf F.W. 189 (Recognition Details).* (Flight, Vol. 43, No. 1,790, 15/4/43, p. A.)
87	9165	Germany ...	*Arado 196 Reconnaissance Seaplane Catapulted from German Cruiser (Photograph).* (Flight, Vol. 43, No. 1,789, 8/4/43, p. 375.)
88	9168	Germany ...	*Messerschmitt Me. 109F (Photo).* (Aeroplane, Vol. 64, No. 1,663, 9/4/43, p. 411.)
89	9191	Germany ...	*New German Aircraft.* (Trade and Engineering Times, Vol. 52, No. 949, March, 1943, p. 36.)
90	9202	Germany ...	*F.W. 190 A-3.* (Trade and Engineering Times, Vol. 52, No. 948, Feb., 1943, p. 36.)

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91	9626	Germany ...	*Photographs of German Aircraft in the Air.* (Aeroplane, Vol. 64, No. 1,658, 5/3/43, p. 263.)
92	9631	Germany ...	*Captured Me. 109F (Photograph).* (Aeroplane, Vol. 64, No. 1,658, 5/3/43, p. 269.)
93	9669	Germany ...	*A New Messerschmitt?* (Flight, Vol. 43, No. 1,785, 11/3/43, p. 250.)
94	9677	Germany ...	*Blohm and Voss BV. 222 Six-Engined Flying Boat (Recognition Details).* (Flight, Vol. 43, No. 1,785, 11/3/43, p. 260.)
95	9709	Germany	*Focke-Wulf F.W. 190 (with Photos).* (M. W. Bourdon, Autom. Ind., Vol. 87. No. 6, 15/9/42, pp. 34-35.)
			Military Types of Aircraft (Japanese).
96	9227	Japan ...	*Japanese Aircraft and Their Crews.* (Flying and Pop. Av., Vol. 32, No. 2, Feb., 1943, pp. 100-103.)
97	9722	Japan ...	*Japanese Fighters.* (Aeronautics, Vol. 8, No. 3, April, 1943, p. 33.)
			Military Types of Aircraft (Italian).
98	9160	Italy	*Caproni Ca. 313 (Recognition Details).* (Flight, Vol. 43, No. 1,789, 8/4/43, p. B.)
99	9163	Italy	*Savoia-Marchetti S.M. 84 Carrying Torpedo (Photograph).* (Flight, Vol. 43, No. 1,789, 8/4/43, p. 368.)
100	9668	Italy	*Burnt Out Caproni Ca. 311 Light Bombers (Photograph).* (Aeroplane, Flight, Vol. 43, No. 1,785, 11/3/43, p. 248.)
101	9676	Italy	*Piaggio P. 108 Bombers (Photograph).* (Flight, Vol. 43, No. 1,785, 11/3/43, p. 257.)
			Military Types of Aircraft (French).
102	9603	France ...	*New French Aircraft.* (Flight, Vol. 43, No. 1,791, 22/4/43, p. 418.)
103	9713	France ...	*The Potez 161.* (Autom. Ind. Vol. 87, No. 6, 15/9/42, pp. 48 and 68.)
			General Design of Military Aircraft.
104	8977	U.S.A. ...	*New Type of Asbestos Fabric.* (Am. Av., Vol. 6, No. 18, 15/2/43, p. 37.)
105	9005	G.B.	*Captured British Aircraft Material (Photograph).* (Luftwelt, Vol. 10, No. 4, 15/2/43, pp. 72-73.)
106	9127	U.S.A. ...	*Birdproof Windshield.* (Ind. and Eng. Chem., Vol. 21, No. 4, 25/2/43, p. 276.)
107	9155	U.S.A. ...	*Lockheed Hydraulic Systems.* (Aeroplane, Vol. 64, No. 1,664, 16/4/43, p. 453.)
108	9444	U.S.A. ...	*Wing Slot of Me. 109 (Design Detail).* (Aviation, Vol. 42, No. 1, p. 171, Jan., 1943.)
109	9551	Germany ...	*H.E. III New Cockpit Arrangement (Photo).* (Flight, Vol. 43, No. 1,786, p. 284.)
110	9557	G.B.	*Spitfire Seat of Laminated Plastics (German Commentary).* (Flight, Vol. 43, No. 1,786, 18/3/43, pp. 291-292.)
111	9625	G.B.	*The Fighter Bomber.* (Aeroplane, Vol. 64, No. 1,658, 5/3/43, p. 263.)

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112	9671	G.B.	*Fighters and Fighter Bombers.* (F. A. de V. Robertson, Flight, Vol. 43, No. 1,785, 11/3/43, pp. 252-256.)
113	9699	U.S.A. ...	*The Development of Impact Resisting Windshields.* (A. L. Morse, S.A.E. Nat. Aeronautics Meeting, March 12-13, 1942.)
114	9723	G.B.	*Twin-Engine Fighters.* (Aeronautics, Vol. 8, No. 3, April, 1943, pp. 36-42.)
115	9767	U.S.A. ...	*Plans for Bomber Transport Capable of Carrying 400 Passengers.* (Autom. Ind., Vol. 87, No. 12, 15/12/42, pp. 48 and 58.)
		Armament (Guns, Turrets, Field Artillery).	
116	9089	G.B.	*The Bristol Power-Operated Gun Turret.* (L. G. Frise, Engineer, Vol. 175, No. 4,553, 16/4/43, pp. 312-314.)
117	9154	G.B.	*Bristol Gun Turrets.* (L. G. Frise, Aeroplane, Vol. 64, No. 1,664, 16/4/43, pp. 450-452.)
118	9169	U.S.A. ...	*Gunner's Pillbox of Consolidated P.B.Y. Flying Boat (Photo).* (Aeroplane, Vol. 64, No. 1,663, 9/4/43, p. 412.)
119	9245	U.S.A. ...	*Aircraft Armament.* (N. W. Ellis, Flying and Pop. Av., Vol. 32, No. 2, Feb., 1943, pp. 189-191 and 256.)
120	9368	U.S.A. ...	*Hydraulic Machine Gun Chargers.* (S. I. Macduff and G. A. Goeffrich, Aero Digest, Vol. 42, No. 2, pp. 243-244, 278-282, 350, Feb., 1943.)
121	9554	G.B.	*Mg. 131 for Bombers and Fighter Bombers.* (Flight, Vol. 43, No. 1,786, 18/3/43, pp. 285-286.)
122	9583	U.S.A. ...	*New American Gun Turret.* (Canadian Aviation, Vol. 16, No. 2, Feb., 1943, p. 82.)
123	9609	G.B.	*Short Sunderland II with Dorsal Two-Gun Turret (Photo).* (Aeroplane, Vol. 64, No. 1,665, p. 468, 23/4/43.)
124	9647	Germany ...	*The German 7.92 mm. Machine Gun Mg. 34.* (M. F. Medlin, Army Ordnance, Vol. 24, No. 137, March-Apr., 1943, pp. 324-327.)
125	9720	Germany ...	*Me. 210 Remote Control Guns.* (Aeronautics, Vol. 8, No. 3, April, 1943, p. 27.)
126	9733	Germany ...	*British Reports on German Aeroplanes—VIII. The Focke-Wulf F.W. 190. (Details of Aircraft Armament and B.M.W. 801 D Engine.)* (Airc. Eng., Vol. 15, No. 169, March, 1943, pp. 76-81.)
127	9752	U.S.A. ...	*American Gun Turrets (Photos).* (Autom. Ind., Vol. 87, No. 11, 1/12/42, pp. 42-43.)
128	9642	U.S.A. ...	*Standardised Inspection.* (R. G. Saunders, Army Ordnance, Vol. 24, No. 137, March-Apr., 1943, pp. 290-292.)
129	9643	U.S.A. ...	*Maintenance and Supply Functions in the Field.* (H. J. Conway, Army Ordnance, Vol. 24, No. 137, March-Apr., 1943, p. 301.)
130	9644	U.S.A. ...	*Self-Propelled Artillery.* (Army Ordnance, Vol. 24, No. 137, March-Apr., 1943, pp. 293-300.)

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131	9652	U.S.A.	...	*Artillery To-Day (including Photographs of Recent German Types).* (H. Rowan-Robinson, Army Ordnance, Vol. 24, No. 136, Jan.-Feb., 1943, pp. 73-76.)
				Ballistics, Bombs, etc.
132	9189	G.B. ...	...	*Firing Backwards.* (Trade and Engineering Times, Vol. 52, No. 949, March, 1943, p. 34.)
133	9291	Germany	...	*Angular Measurements in Ballistics.* (K. Gey, Introduction to Ballistics, 1937, pp. 64-65.)
134	9726	G.B. ...	...	*The Pursuit Effect.* (B. H. Rabineau, Aeronautics, Vol. 8, No. 3, April, 1943, pp. 50-57.)
135	9128	U.S.A.	...	*Chemical Smoke Screens.* (Ind. and Eng. Chem., Vol. 21, 25/2/43, p. 277.)
136	9645	U.S.A.	...	*Toluene for Japan's Explosives.* (B. O. Lisle, Army Ordnance, Vol. 24, No. 137, March-Apr., 1943, p. 304.)
137	9728	U.S.S.R.	...	*Russian Aircraft Equipped with Flame-Throwers.* (Aeronautics, Vol. 8, No. 3, April, 1943, p. 68.)
				Naval Air Arm.
138	9235	U.S.A.	...	*Aerology in U.S. Naval Air Arm.* (H. T. Orville, Flying and Pop. Av., Vol. 32, No. 2, Feb., 1943, pp. 140-142 and 288 and 294.)
139	9233	U.S.A.	...	*Naval Aviation's Ground Crews.* (Flying and Pop. Av., Vol. 32, No. 2, Feb., 1943, pp. 129-130 and 300.)
140	9232	U.S.A.	...	*U.S. Navy's Air Transport.* (C. H. Schildhauer, Flying and Pop. Av., Vol. 32, No. 2, Feb., 1943, pp. 127-128 and 236-238.)
141	9231	U.S.A.	...	*U.S. Navy Coast Guard Aviation.* (Flying and Pop. Av., Vol. 32, No. 2, Feb., 1943, pp. 114-116 and 236-238.)
142	9220	U.S.A.	...	*Survey of U.S. Naval Air Battles Since the War.* (Flying and Pop. Aviation, Vol. 32, No. 2, Feb., 1943, pp. 72-76 and 192, 199-202.)
143	9214	Canada	...	*The Navy's Air Arm.* (Frank Knox, Flying and Pop. Aviation, Vol. 32, No. 2, Feb., 1943, pp. 47 and 286.)
144	9241	U.S.A.	...	*Technicians in the U.S. Naval Air Arm.* (F. Tupper, Flying and Pop. Av., Vol. 32, No. 2, Feb., 1943, pp. 174-177.)
145	9630	U.S.A.	...	*Grumman Martlets as Naval Fighters (Photograph).* (Aeroplane, Vol. 64, No. 1,658, 5/3/43, p. 268.)
146	9226	U.S.A.	...	*U.S. Navy Torpedo Bombers.* (D. E. Wilcox, Flying and Pop. Av., Vol. 32, No. 2, Feb., 1943, pp. 98-99.)
147	9225	U.S.A.	...	*Patrol Bombers in U.S. Navy.* (T. R. Frederick, Flying and Pop. Av., Vol. 32, No. 2, Feb., 1943, pp. 92-96 and 297.)
148	9224	U.S.A.	...	*Scout Observation Planes in U.S. Navy.* (M. K. Fleming, Flying and Pop. Aviation, Vol. 32, No. 2, Feb., 1943, pp. 89-90.)

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149	9222	U.S.A. ...	*U.S. Naval Fighter Aircraft.* (J. S. Thach, Flying and Pop. Aviation, Vol. 32, No. 2, Feb., 1943, pp. 82-84 and 244.)
150	9223	U.S.A. ...	*U.S. Naval Scout Bombers.* (I. L. Kimes, Flying and Pop. Aviation, Vol. 32, No. 2, Feb., 1943, pp. 86-88 and 280.)
151	9219	U.S.A. ...	*U.S. Naval Aircraft (Photographs).* (Flying and Pop. Aviation. Vol. 32, No. 2, Feb., 1943, pp. 51-71.)
152	9605	U.S.A. ...	*Lockheed Vega PBV-1 Ventura of the U.S. Navy (Photo).* (Aeroplane, Vol. 64, No. 1,665, p. 464, 23/4/43.)
153	9553	U.S.A. ...	*U.S. Navy Helldiver S.B.2C-1 (Recog. Details).* (Flight, Vol. 43, No. 1,786, 18/3/43, p. b.)
154	9731	U.S.A. ...	*The Grumman Tarpon T.F.B. 1 (Avenger), New Fleet Air Arm Types (Recog. Details).* (Airc. Eng., Vol. 15, No. 169, March, 1943, pp. 54 and 69.)
155	9629	G.B.	*Supermarine Seafire on Aircraft Carrier (Photograph).* (Aeroplane, Vol. 64, No. 1,658, 5/3/43, p. 267.)
156	9221	U.S.A. ...	*U.S. Aircraft Carriers.* (F. C. Sherman, Flying and Pop. Aviation, Vol. 32, No. 2, Feb., 1943, pp. 78-80 and 229-230.)
157	9484	G.B.	*Aircraft Carrier H.M.S. Indomitable on Active Service (Photographs).* (Flight, Vol. 43, No. 1,792, 29/4/43, pp. 446-447.)
158	9243	U.S.A. ...	*U.S. Navy's Non-Rigid Airships.* (T. G. W. Settle, Flying and Pop. Av., Vol. 32, No. 2, Feb., 1943, pp. 184, 266 and 272.)
159	9229	U.S.A. ...	*Gliders and Gliding in the U.S. Navy.* (J. Wehle, Flying and Pop. Av., Vol. 32, No. 2, Feb., 1943, pp. 109-110 and 283.)
			Troop Transport.
160	9147	France ...	*S.E. 200 Six-Motor Flying Boat (Photo).* (Aeroplane, Vol. 64, No. 1,664, 16/4/43, p. 438.)
161	9148	U.S.A. ...	*The Douglas C-47 as an Ambulance.* (Aeroplane, Vol. 64, No. 1,664, 16/4/43, p. 439.)
162	9150	Germany ...	*Ju. 52/3 m. Transports Flying Over Mediterranean (Photo).* (Aeroplane, Vol. 64, No. 1,664, 16/4/43, p. 440.)
163	9578	U.S.A. ...	*Lockheed "Constellation" (Photograph).* (Canadian Aviation, Vol. 16, No. 2, Feb., 1943, p. 43.)
164	9627	U.S.A. ...	*Lockheed C-69 Constellation Four-Motor Transport (Photograph).* (Aeroplane, Vol. 64, No. 1,658, 5/3/43, p. 265.)
165	9634	G.B.	*De Havilland Albatross (Photograph).* (Aeroplane, Vol. 64, 1,658, 5/3/43, p. 272.)
166	9636	U.S.A. and China ...	*Douglas C-53 Transport in China (Photograph).* (Aeroplane, Vol. 64, No. 1,658, 5/3/43, p. 273.)
167	9640	U.S.A. ...	*Curtiss C-76 Caravan Two-Motor Transport (Photograph).* (Aeroplane, Vol. 64, No. 1,658, 5/3/43, p. 284.)

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168	9650	U.S.A.	...	*The New Curtiss Caravan Army Transport.* (Army Ordnance, Vol. 24, No. 137, March-April, 1943, pp. 334-335.)
169	9673	G.B. ...	...	*De Havilland Albatross (Recognition Details).* (Flight, Vol. 43, No. 1,785, 11/3/43, p. a.)
170	9678	Germany	...	*Messerschmitt ME. 323 Transport Monoplane.* (Flight, Vol. 43, No. 1,785, 11/3/43, p. 260.)
171	9729	Germany	...	*Junkers 90 Four-Engined Troop Carrier (Photograph).* (Aeronautics, Vol. 8, No. 3, April, 1943, p. 68.)
172	8983	U.S.A.	...	*The Curtiss C-76 "Caravan" (Photograph).* (U.S. Air Services, Vol. 28, No. 1, Jan., 1943, p. 36.)
				Trainers.
173	8984	U.S.A.	...	*Fairchild Plastic Plywood Trainer AT-14 (Photograph).* (U.S. Air Services, Vol. 28, No. 1, Jan., 1943, p. 40.)
174	9186	G.B. ...	...	*Miles M.28.* (Trade and Engineering Times, Vol. 52, No. 949, March, 1943, p. 32.)
175	9478	G.B. ...	...	*Miles M.28 (Recognition Details).* (Flight, Vol. 43, No. 1,792, 29/4/43, p. a.)
176	9479	U.S.A.	...	*Piper L-59A (Recognition Details).* (Flight, Vol. 43, No. 1,792, 29/4/43, p. b.)
177	9550	U.S.A.	...	*Lockheed AT-18 (Trainer Version of Hudson).* (Flight, Vol. 43, No. 1,786, 18/3/43, p. 283.)
178	9589	U.S.A.	..	*The Lockheed AT-18 Trainer (Photograph).* (Canadian Aviation, Vol. 16, No. 2, Feb., 1943, p. 112.)
179	9641	G.B. ...	...	*Oxford II Trainer (Photograph).* (Aeroplane, Vol. 64, No. 1,658, 5/3/43, p. 279.)
180	9690	Canada	...	*The New Cornell Trainer (Recog. Details).* (Flight, Vol. 43, No. 1,791, pp. 413-416, 22/4/43.)
181	9716	U.S.A.	...	*Beechcraft Bomber-Pilot Trainer (Wood Construction) (Photo).* (Autom. Ind., Vol. 87, No. 6, 15/9/42, p. 54.)
182	9718	U.S.A.	...	*Ryan Plywood Trainer (Photo).* (Autom. Ind., Vol. 87, No. 6, 15/9/43, p. 56.)
183	9725	G.B. ...	...	*Miles M-28 (Recog. Details).* (Aeronautics, Vol. 8, No. 3, April, 1943, p. 46.)
184	9746	U.S.A.	...	*Fairchild Cornell Trainer (Photo).* (Canadian Aviation, Vol. 15, No. 8, Aug., 1942, p. 89.)
185	9779	U.S.A.	...	*PT-25 Plywood Trainer is Tested.* (Autom. Ind., Vol. 87, No. 5, 1/9/42, pp. 48.)
				Gliders.
186	9010	Italy ...	...	*Italian Glider Canguro CVV. 6.* (Flugsport, Vol. 35, No. 7, 31/3/43, pp. 77-78.)
187	9164	Denmark	...	*Danish Gliding.* (Flight, Vol. 43, No. 1,789, 8/4/43, p. 368.)
188	9170	U.S.A.	...	*American Aeroplanes, Training Gliders in Service. IX (Silhouettes).* (Aeroplane, Vol. 64, No. 1,663, 9/4/43, p. 415.)
189	9171	G.B. ...	...	*Handley Page H.P. 42 Air Speed Horsa (Photo).* (Aeroplane, Vol. 64, No. 1,663, 9/4/43, p. 416.)
190	9176	G.B. ...	...	*Miles Master II as a Tug for Hotspur Gliders (Photo).* (Aeroplane, Vol. 64, No. 1,663, 9/4/43, p. 424.)

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191	9488	U.S.A.	...	*CG4 Waco Glider Carrying Jeep* (*Photograph*). (Flight, Vol. 43, No. 1,792, 29/4/43, p. 456.)
192	9548	G.B. ...	...	*Glider Pick-up.* (Flight, Vol. 43, No. 1,786, 18/3/43, pp. 280-282.)
193	9556	Japan	...	*Japan's Gliders.* (Flight, Vol. 43, No. 1,786, 18/3/43, p. 289.)
194	9615	U.S.A.	...	*Gliders in the U.S.A.* (H. W. Perry, Aeroplane, Vol. 64, No. 1,665, pp. 476-477, 23/4/43.)
195	9617	G.B. ...	...	*Airspeed Horsa Glider* (*Recog. Details*). (Aeroplane, Vol. 64, No. 1,665, p. 481, 23/4/43.)
196	9717	U.S.A.	...	*Laister-Kauffman Training Glider* (*Photo*). (Autom. Ind., Vol. 87, No. 6, 15/9/43, p. 52.)
197	9741	U.S.A.	...	*Glider Pick-up* (*Photo*). (Canadian Aviation, Vol. 15, No. 8, Aug., 1942, p. 42.)
198	8974	U.S.A.	...	*Interior Photo of Waco 15 Place Glider.* (Am. Av., Vol. 6, No. 18, 15/2/43, p. 17.)
				Equipment.
199	9197	G.B. ...	...	*Fireproof Clothing.* (Trade and Engineering Times, Vol. 52, No. 948, Feb., 1943, p. 32.)
200	8976	U.S.A.	...	*Cable Tester* (*Photograph*). (Am. Av., Vol. 6, No. 18, 15/2/43, p. 36.)
201	8979	U.S.A.	...	*New Fire Extinguisher.* (Am. Av., Vol. 6, No. 18, 15/2/43, p. 37.)
202	9012	Germany	...	*Jettisoning Supplies from Aircraft* (*Photographs Showing Containers in Position*). (Flugsport, Vol. 35, No. 7, 31/3/43, p. 83.)
203	9027	Germany	...	*Sea Anchor.* (*Pat. series No. 2* (730,942). (Arado, Flugsport, Vol. 35, No. 7, 31/3/43, p. 12.)
204	9228	U.S.A.	...	*U.S. Paratroops and Their Equipment.* (L. E. Marie, Flying and Pop. Av., Vol. 32, No. 2, Feb., 1943, pp. 106-108 and 294.)
205	9244	U.S.A.	...	*Life-Saving Equipment.* (J. E. Sullivan, Flying and Pop. Av., Vol. 32, No. 2, Feb., 1943, pp. 186-188 and 296.)
206	9356	U.S.A.	...	*New Type of Life-Saving Raft.* (Aero Digest, Vol. 42, No. 2,pp. 156, 350-351, Feb., 1943.)
207	9604	Germany	...	*New Lightweight Clothing Outfit for Luftwaffe Pilots.* (Flight, Vol. 43, No. 1,791, 22/4/43, p. 418.)
208	9611	U.S.A.	...	*Some Details of U.S. "Secret" Norden Bombsight.* (Aeroplane, Vol. 64, No. 1,665, p. 472, 23/4/43.)
209	9612	Germany	...	*New German Devices and Patents.* (Aeroplane, Vol. 64, No. 1,665, p. 474, 23/4/43.)
210	9691	Germany	...	*German Parachute Supply Containers* (*Photo*). (Flight, Vol. 43, No. 1,791, 22/4/43, p. 418.)
211	9762	U.S.A.	...	*D.C. Generators for Aircraft* (*Elec. Equipment*). (P. M. Heldt, Autom. Ind., Vol. 87, No. 12, 15/12/42, pp. 36-39.)

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			Anti-Aircraft and A.R.P.
212	8989	G.B. ...	... *Application of Small Diameter "Unbreakable" Syphon Systems to the Drainage of Trench Air-Raid Shelters and the Like.* (D. F. F. Brewster, J. Inst. Civil Engs., Vol. 20, No. 5, March, 1943, pp. 19-26.)
213	9139	G.B. ...	... *Water-Borne Balloons.* (N. D. Ryder, Flight, Vol. 43, No. 1,790, 15/4/43, pp. 383-386.)
214	9230	Canada	... *Barrage Balloons.* (B. L. Smith, Flying and Pop. Av., Vol. 32, No. 2, Feb., 1943, pp. 111-113 and 298-299.)
215	9357	U.S.A.	.... *Infra-Red Camouflage.* (L. E. Bowles, Aero Digest, Vol. 42, No. 2, pp. 159-162, 292-295, Feb., 1943.)
216	9369	U.S.A.	... *Protection Against War Chemicals (Chart).* (W. P. Burn, Metal Progress, Vol. 42, No. 4, Oct., 1942, p. 522 R.)
217	9481	Germany	... *"Flak Train" Adopted by the Germans (Photographs).* (Flight, Vol. 43, No. 1,792, 29/4/43, p. 445.)
218	9654	U.S.A.	.... *40 mm. Bofors Anti-Aircraft Gun Redesigned from Riveted to Welded Construction.* (Army Ordnance, Vol. 24, No. 136, Jan.-Jeb., 1943, p. 115.)
			Aerodynamics and Hydrodynamics.
219	9059	U.S.A.	... *Determination of Fuselage Moments (Digest).* (C. E. Pappas, J.S.A.E., Vol. 51, No. 2, Feb. 10, 1943, p. 72.)
225	9353	U.S.A.	... *Statistical Investigation of the V^2 Law for Lift.* (H. G. Smith, Aero Digest, Vol. 42, No. 2, pp. 144, 352-355, Feb., 1943.)
226	9473	U.S.A.	... *Prospective Construction of New Gust Tunnel at Langley Field.* (Flight, Vol. 43, No. 1,792, 29/4/43, p. 438.)
227	9474	U.S.A.	... *N.A.C.A. Research Programme.* (Flight, Vol. 43, No. 1,792, 29/4/43, p. 438.)
228	9511	G.B. ...	... *Roughness Factors in Fluid Motion Through Cylindrical Pipes and Through Open Channels.* (J. Allen, J. Inst. of Civil Engs., Vol. 20, No. 6, April, 1943, pp. 91-107.)
229	9569	G.B. ...	... *Breakwaters (contd.).* (R. R. Minikin, Engineering, Vol. 155, No. 4,033, 30/4/43, pp. 342-343.)
230	9730	G.B. ...	... *The Resistance of a Smooth Flat Plate with Turbulent Boundary Layer.* (W. M. Falkner, Airc. Eng., Vol. 15, No. 169, March, 1943, pp. 65-69.)
			Aircraft, Airscrews and Accessories.
			General (including Take-off).
231	9215	Canada	... *Bureau of Aeronautics.* (J. S. McCain, Flying and Pop. Av., Vol. 32, No. 2, Feb., 1943, p. 50.)
232	9239	U.S.A.	... *The Catapult.* (J. A. Haley, Flying and Pop. Av., Vol. 32, No. 2, Feb., 1943, pp. 167-168.)

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233	*9427	U.S.A. ...	*Technique to Shorten Take-offs and Landings.* (R. de H. Williams, Aviation, Vol. 42, No. 1, pp. 94-95, 313-319.)
234	*9429	U.S.A. ...	*Rocket Power for Assisted Take-off.* (R. Healy, Aviation, Vol. 42, No. 1, pp. 100, 221-223, Jan., 1943.)
235	9633	G.B.	*Bird Flight.* (Aeroplane, Vol. 64, No. 1,658, 5/3/43, p. 271.)
236	9680	G.B.	*Corrections Applied to Indicated Altitudes.* (C. Williams, Flight, Vol. 43, No. 1,785, 11/3/43. pp. 261-262.)
			Design and Construction.
237	9047	U.S.A. ...	*Aircraft Structural Testing (Digest).* (B. L. S. Pringer, J.S.A.E., Vol. 51, No. 2, Feb., 1943, pp. 72-73.)
238	9079	U.S.A. ...	*Non-Critical Materials for Airframe Construction (Digest).* (L. D. Bonham, J.S.A.E., Vol. 50, No. 11, Nov., 1942, p. 61.)
239	9144	G.B.	*Some Future Designs for Civil and Military Transports (Unorthodox Types).* (C. A. H. Pollit, J. H. Lover, Flight, Vol. 43, No. 1,790, 15/4/43, pp. 393-396.)
240	9151	G.B.	*New Aeroplane Designs.* (Aeroplane, Vol. 64, No. 1,664, 16/4/43, p. 438.)
241	9158	G.B.	*Rotating Wing Aircraft—II.* (Flight, Vol. 43, No. 1,789, 8/4/43, pp. 359-364.)
242	9345	U.S.A. ...	*A.N.C.5 Strength of Aircraft Materials, Dec.*, 1942. (Issued by the Army-Naval Civil Committee on Aircraft Design Criteria.)
243	9437	U.S.A. ...	*Design Considerations for Plywood Structures (Pt. III).* (L. J. Marhoefer, Aviation, Vol. 42, No. 1, pp. 150-153, 348-349, Jan., 1943.)
244	9596	G.B.	*Applications of Resilitex in Aircraft Upholstery.* (Air. Prod., Vol. 5, No. 55, May, 1943, p. 229.)
245	9715	U.S.A. ...	*Flying Fuselage, Desirable Aerodynamic Qualities.* (Autom. Ind., Vol. 87, No. 6, 15/9/42, p. 54.)
246	9742	Canada ...	*Glue in Modern Aircraft.* (J. G. MacDermott, Canadian Aviation, Vol. 15, No. 8, Aug., 1942, pp. 55-58, 80-84.)
247	9580	Canada ...	*Tricycle Landing Gears.* (Canadian Aviation, Vol. 16, No. 22, Feb., 1943, p. 78.)
248	9684	G.B.	*Advantage of the Castoring Nose Wheel.* (Flight, Vol. 43, No. 1,785, 11/3/43, p. 265.)
249	9695	G.B.	*The Tricycle Undercarriage.* (Flight, Vol. 43, No. 1,791, 22/4/43, pp. 422-423.)
250	9098	G.B.	*The "Bristol" Hydraulic System for Aeroplanes.* (Engineering, No. 155, No. 4,030, 9/4/43, p. 294.)
251	9125	U.S.A. ...	*Cellulose Seals for Aeroplane Pipes.* (British Plastics, Vol. 14, No. 167, April, 1943, p. 666.)
252	9190	G.B.	*Aircraft Control Device.* (Trade and Engineering Times, Vol. 52, No. 949, March, 1943, p. 35.)
253	9485	G.B.	*Aileron Control.* (Flight, Vol. 43, No. 1,792, 29/4/43, p. 448.)

* Abstract available.

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254	9246	U.S.A. ...	*New Plastic Fuel Tank.* (Flying and Pop. Av., Vol. 32, No. 2, Feb., 1943, p. 234.)
255	*9440	U.S.A. ...	*Detachable Fuel Tank of Moulded Plywood.* (Aviation, Vol. 42, No. 1, p. 163, Jan., 1943.)
256	9714	U.S.A. ...	*Streamlined Spare Fuel Tanks (Photo).* (Autom. Ind., Vol. 87, No. 6, 15/9/42, p. 50.)
			Civil and Experimental Aircraft Types.
257	9140	G.B.	*The Nuffield-Napier Heston Racer.* (Flight, Vol. 43, No. 1,790, 15/4/43, pp. 387-391.)
258	9153	G.B.	*The Napier Heston Racer.* (Aeroplane, Vol. 64, No. 1,664, 16/4/43, pp. 447-449.)
259	9167	G.B.	*Heston Racer (Photograph).* (Aeroplane, Vol. 64, No. 1,663, 9/4/43, p. 409.)
260	9584	Germany ...	*Civil Heinkel He. 274.* (Canadian Aviation, Vol. 16, No. 2, Feb., 1943, p. 82.)
261	9674	G.B.	*Armstrong Whitworth Ensign (Recog. Details).* (Flight, Vol. 43, No. 1,785, 11/3/43, p. b.)
262	9708	Italy	*Caproni-Campini CC-2 Aircraft (Photograph).* (Autom. Ind., Vol. 87, No. 6, 15/9/42, p. 31.)
263	8991	G.B.	*Henson's "Aerial Steam Carriage," 1843.* (J. E. Hodgson, J. Roy. Aeron. Soc., Vol. 47, No. 388, April, 1943, pp. 118-128.)
			Air Cargo and Air Lines.
264	9073	U.S.A. ...	*Engineering Problems of Air Cargo Transportation.* (R. D. Kelly and W. W. Davies, J.S.A.E., Vol. 50, No. 11, Nov., 1942, pp. 492-498.)
265	9349	U.S.A. ...	*The Present Cargo Plane Situation.* (L. V. Spencer, Aero Digest, Vol. 42, No. 2, pp. 113-116, 351-352, Feb., 1943.)
266	9359	U.S.A. ...	*Aeroplane Design for Cargo Transport.* (C. Wood, Aero Digest, Vol. 42, No. 2, pp. 185-190, 219-250, Feb., 1943.)
267	9448	U.S.A. ...	*Who Should Carry Air Cargo?* (J. H. Frederick, Aviation, Vol. 42, No. 1, pp. 255-257, 344.)
268	9549	G.B.	*Stowing Air Freight (New Equipment).* (Flight, Vol. 43, No. 1,786, 18/3/43, pp. 282-283.)
269	9635	G.B.	*The Future of British Air Commerce.* (Aeroplane, Vol. 64, No. 1,658, 5/3/43, p. 272.)
270	9701	U.S.A. ...	*Engineering Problems Associated with Air Cargo Transportation.* (R. D. Kelly and W. W. Davies, S.A.E. Nat. Aeronautics Meeting, March, 1942.
271	8610	U.S.A. ...	55 *Essential Airline Jobs Listed.* (Am. Av., Vol. 222, No. 10, 15/10/42, p. 26.)
272	8975	U.S.A. ...	*Air Transport Information Office Compiles Data for Post-War Lines.* (R. H. Wood, Am. Av., Vol. 6, No. 18, 15/2/43, pp. 24 and 48.)
273	9152	G.B.	*Operators of Air Transports.* (Sir Alan Cobham, Aeroplane, Vol. 64, No. 1,664, 16/4/43, pp. 445-446.)
274	9172	G.B.	*Possible Air Routes of the Future.* (Aeroplane, Vol. 64, No. 1,663, 9/4/43, pp. 18-19.)
275	9178	G.B.	*Trans-Australia Service.* (Aeroplane, Vol. 64, No. 1,663, 9/4/43, p. 430.)

* Abstract available.

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276	9347	U.S.A. ...	*Expansion of Post-War Air Transportation.* (H. R. Stringer, Aero Digest, Vol. 42, No. 2, pp. 95-96, 296-303, Feb., 1943.)
277	9486	U.S.A. ...	*International Air Transport.* (A. Kunzler, Flight, Vol. 43, No. 1,792, 29/4/43, pp. 449-450.)
278	9577	Canada ...	*Canadian Pacific Air Lines (Symposium of Articles).* (Can. Av., Vol. 16, No. 2, Feb., 1943, pp. 45-70.)
279	9601	G.B.	*Trade and Air Transport.* (Flight, Vol. 43, No. 1,791, 22/4/43, p. 423.)
280	9637	G.B.	*Transports and Air Ports.* (J. P. Chaplin, Aeroplane, Vol. 64, No. 1,658, 5/3/43, pp. 274-275.)
281	9683	G.B.	*Report of the General Council of Shipping on Air and Sea Transport.* (Flight, Vol. 43, No. 1,785, 11/3/43, p. 264.)
282	9764	U.S.A. ...	*Air vs. Rail and Water Transport.* (W. A. Patterson, Autom. Ind., Vol. 87, No. 12, 15/12/42, pp. 17-19 and 66-67.)
			Propellers and Fans.
283	9173	G.B.	*Saving Damaged Airscrews.* (Aeroplane, Vol. 64, No. 1,663, 9/4/43, pp. 420-421.)
285	9365	U.S.A. ...	*Contra-Rotating Propellers.* (Aero Digest, Vol. 42, No. 2, pp. 228-231, Feb., 1943.)
286	9366	U.S.A. ...	*Wickwire Automatic V.P. Propeller.* (Aero Digest, Vol. 42, No. 2, pp. 231, 242, Feb., 1943.)
287	9443	U.S.A. ...	*New Hydraulic Dual Rotation Propeller (Hollow Steel Blades).* (Aviation, Vol. 42, No. 1, p. 165, Jan., 1943.)
288	9724	U.S.A. ...	*Wickwire Automatic V.P. Propeller.* (Aeronautics, Vol. 8, No. 3, April, 1943, p. 45.)
289	9754	G.B.	*New Rotol Propeller for Trainers.* (Autom. Ind., Vol. 87, No. 11, 1/12/43, p. 46.)
			Pressure Cabins.
290	9013	Germany ...	*Cut-outs in Pressure Cabins. (Pat. series No. 2,* 731,810.) (Junkers, Vol. 35, No. 7, 31/3/43, p. 5.)
291	9014	Germany ...	*Double Windows with Air Seal. (Pat. series No. 2,* 731,688.) (Junkkers, Flugsport, Vol. 35, No. 7, 31/3/43, p. 5.)
292	9058	U.S.A. ...	*Cabin Supercharging in Scheduled Airline Operation (Digest).* (R. L. Ellinger, J.S.A.E., Vol. 51, No. 2, Feb. 10, 1943, p. 72.)
293	9195	G.B.	*Pressure Chambers.* (Trade and Engineering Times, Vol. 52, No. 948, Feb., 1943, pp. 31-32.)
			Patents.
294	9017	Germany ...	*Boundary Layer Control (Reduced Air Requirements). (Pat. series No. 2,* 729,949.) (Junkers, Flugsport, Vol. 35, No. 7, 31/3/43, p. 6.)
295	9018	Germany ...	*Prevention of Overload on Landing Flaps. (Pat. series No. 2,* 731,545.) (Dornier, Flugsport, Vol. 35, No. 7, 31/3/43, pp. 6-7.)
296	9019	Germany ...	*Automatic Pilot (Pat. series No. 2,* 730,006.) (Siemens, Flugsport, Vol. 35, No. 7, 31/3/43, p. 7.)

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297	9020	Germany ...	*Fowler Flap Modifications.* (*Pat. series No.* 2, 729,663.) (Heinkel, Flugsport, Vol. 35, No. 7, 31/3/43, pp. 7-8.)
298	9021	Germany ...	*Split Control Column (Two-Handed Type).* (*Pat. series No.* 2, 730,007.) (Junkers, Flugsport, Vol. 35, No. 7, 31/3/43, p. 8.)
299	9022	Germany ...	*Control Column Arranged Behind Pilot with Lateral Extensions for Hand Operations.* (*Pat. series No.* 2, 731,161.) (Henschel, Flugsport, Vol. 35, No. 7, 31/3/43, p. 8.)
300	9024	Germany ...	*Flanged Fitting for Aircraft Parts.* (*Pat. series No.* 2, 731,546.) (Arado, Flugsport, Vol. 35, No. 7, 31/3/43, p. 9.)
301	9025	Germany ...	*Boundary Layer Control for Seaplane Hulls.* (*Pat. series No.* 2, 729,950.) (Dornier, Flugsport, Vol. 35, No. 7, 31/3/43, p. 12.)
302	9026	Germany ...	*Automatic Coupling for Autogyros.* (*Pat. series No.* 2, 731,109.) (B.M.W., Flugsport, Vol. 35, No. 7, 31/3/43, pp. 9-10.)
303	9028	Germany ...	*Spring Leg with Fluid Damping.* (*Pat. series No.* 2, 731,592.) (Messerschmitt, Flugsport, Vol. 35, No. 7, 31/3/43, p. 10.)
304	9029	Germany ...	*Locking Device for Retractable Undercarriage.* (*Pat. series No.* 2, 731,592.) (Arado, Flugsport, Vol. 35, No. 7, 31/3/43, p. 11.)
305	9030	Germany ...	*Spring Leg for Tail Wheels.* (*Pat. series No.* 2, 720,540.) (Elektron, Flugsport, Vol. 35, No. 7, 31/3/43, p. 10.)
306	9031	Japan ...	*Collapsible Floats for Aircraft (Operated by Compressed Air).* (*Pat. series No.* 2, 731,378.) (T. Nakagawa, Flugsport, Vol. 35, No. 7, 31/3/43, p. 11.)
307	9071	Germany ...	*Retracted Undercarriage Suspension.* (*Pat. series No.* 2, 731,274.) (Arado, Flugsport, Vol. 35, No. 7, 31/3/43, pp. 10-11.)

Engines and Accessories.

Named Types.

308	8980	U.S.A. ...	*Lycoming New Flat Geared Engine (G.O.-435).* (Am. Av., Vol. 6, No. 18, 15/2/43, p. 44.)
309	9200	G.B.	*B.M.W. 801 A-1 Engine—Construction Details.* (Trade and Engineering Times, Vol. 52, No. 948, Feb., 1943, p. 35.)
310	9206	U.S.A. ...	*Some American Aircraft Powered by Cyclone Engines (Photographs).* (Trade Winds, Feb., 1943, pp. 10-11.)
311	9207	U.S.A. ...	*Cyclone 2,600-A Engine (Photograph).* (Trade Winds, Feb., 1943, pp. 10-11.)
312	9313	U.S.A. ...	*1,000 h.p. Diesel Electro-Motive Engine (Photograph).* (Nat. Pet. News, Vol. 35, No. 4, 27/1/43, p. 32.)
313	9469	G.B.	*Napier Sabre Sleeve-Valve 24-Cylinder Engine (Photograph).* (Flight, Vol. 43, No. 1,792, 29/4/43, p. 434.)

ITEM NO.	R.T.P. REF.			TITLE AND JOURNAL.
314	9547	Germany	...	*Junkers Radial and Twin Daimler-Benz Engines.* (G. Smith, Flight, Vol. 43, No. 1,786, 18/3/43, p. 279.)
315	9655	Germany	...	*B.M.W. 801 A Developed from Pratt and Whitney 14-Cylinder Twin Wasp.* (Army Ordnance, Vol. 24, No. 136, Jan.-Feb., 1943, pp. 116-117.)
316	9679	Germany	...	*New Daimler Benz D.B. 606 (Double Engine Mounted Side by Side).* (Flight, Vol. 43, No. 1,785, 11/3/43, p. 260.)
317	9749	U.S.A.	...	*Two-Stroke Diesel with Exhaust Turbo-Supercharger (Pt. II).* (J. W. Swisstunoff, Autom. Ind., Vol. 87, No. 11, 1/12/42, pp. 26-30.)
318	9759	G.B.	...	*Bristol Hercules 1,600 h.p. 14-Cylinder Power Plant (Drawing).* (Autom. Ind., Vol. 87, No. 12, 15/12/42, p. 29.)
319	9777	U.S.A.	...	*Diesel Engine Problems.* (Autom. Ind., Vol. 87, No. 5, 1/9/42, pp. 44, 76-80.)
				Design and Installation.
320	9009	G.B.	...	*Technical Abstracts issued by Aero Engine Dept., Bristol Aeroplane Co., Ltd.* (Vol. 8, No. 13, April 1, 1943.)
321	9054	U.S.A.	...	*Aviation Power Plants (Digest).* (S. A. Moss, J.S.A.E., Vol. 51, No. 2, Feb. 10, 1943, pp. 69-70.)
322	9056	U.S.A.	...	*New Material for Aircraft Engines (Digest).* (M. H. Young, J.S.A.E., Vol. 51, No. 2, Feb. 10, 1943, p. 71.)
323	9057	U.S.A.	...	*Accessory Power for Aircraft (Digest).* (T. B. Holliday, J.S.A.E., Vol. 51, No. 2, Feb. 10, 1943, pp. 71-72.)
324	9506	G.B.	...	*Precision Governing of Engines.* (Mech. World, Vol. 113, No. 2,937, 16/4/43, pp. 416-417.)
325	9585	Germany	...	*Installation of Engine in Rear of Aeroplane (Dornier Patent).* (Canadian Aviation, Vol. 16, No. 2, Feb., 1943, p. 82.)
326	9707	G.B.	...	*Jet Propulsion Developments.* (P. M. Heldt Autom. Ind., Vol. 87, No. 6, 15/9/42, pp. 30-33.)
327	9711	U.S.A.	...	*Decline of the Long-Stroke Engine.* (Autom. Ind., Vol. 87, No. 6, 15/9/42, p. 45.)
				Testing and Overhaul.
328	9048	U.S.A.	...	*Influence of Engine Adjustment and Octane Number on Performance of Commercial Vehicles (Digest).* (D. P. Brenz and others, J.S.A.E., Vol. 51, No. 2, Feb., 1943, Vol. 51, No. 2, Feb., 1943, p. 63.)
329	9055	U.S.A.	...	*Stress Determination in Engine Parts (Digest).* (C. Lipson, J.S.A.E., Vol. 51, No. 2, Feb. 10, 1943, pp. 70-71.)
330	9201	G.B.	...	*New Engine Test Beds for Fuel Economy.* (Trade and Engineering Times, Vol. 52, No. 948, Feb., 1943, p. 35.)

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331	9364	U.S.A.	...	*Power Recovery System of Testing Aircraft Engines.* (G. E. Cassidy and others, Aero Digest, Vol. 42, No. 2, pp. 223-227, 268-271, Feb., 1943.)
332	9581	Canada	...	*Recovering Power from the Testing of Aeroplane Engines.* (Canadian Aviation, Vol. 16, No. 2, Feb., 1943, pp. 80-82.)
333	9592	G.B. ...	...	*Engine Testing (Rootes' New Test House).* (F. G. Sheffield, Airc. Prod., Vol. 5, No. 55, May, 1943, pp. 211-217.)
334	9702	U.S.A.	..	*Production Testing Facilities of Allison Division of General Motors.* (H. J. Buttner, S.A.E. National Aeronautics Meeting, March 1942.)
335	9758	U.S.A.	...	*Power Recovery in Testing Aircraft Engines.* (C. A. Chayne, Autom. Ind., Vol. 87, No. 12, 15/12/42, pp. 26-28, 84-85.)
336	9045	U.S.A.	...	*Reconditioning Cylinder Block and Fitting Sleeves.* (J.S.A.E., Vol. 51, No. 2, Feb. 10, 1943, pp. 49-51.)
337	9074	U.S.A.	...	*Limiting Factors of Overhaul Periods for Aircraft Engines.* (M. Whistlock, J.S.A.E., Vol. 50, No. 11, Nov., 1942, pp. 499-508.)
				Cold Starting.
338	9061	U.S.A.	...	*The Effect of Injection Pumps on Cold Starting of Diesels (Digest).* (M. M. Koensch, J.S.A.E., Vol. 51, No. 2, Feb. 10, 1943, p. 74.)
339	9062	U.S.A.	...	*Cranking Power and Torque Requirements of Diesels at Zero Temperature (Digest).* (H. L. Knudsen, J.S.A.E., Vol. 51, No. 2, Feb. 10, 1943, p. 74.)
340	9064	U.S.A.	...	*Cold Starting Tests on Diesel Engines (Digest).* (H. R. Porter, J.S.A.E., Vol. 51, No. 2, Feb. 10, 1943, p. 74.)
341	9067	U.S.A.	...	*The Importance of Accessory Equipment in Cold Starting of Diesels (Digest).* (F. C. Burk, J.S.A.E., Vol. 51, No. 2, Feb., 1943, p. 74.)
342	9068	U.S.A.	...	*Special Cold Starting Fuel for Diesel Engines (Digest).* (C. H. Cloud and L. M. Ferenzi, J.S.A.E., Vol. 51, No. 2, Feb., 1943, p. 75.)
343	9069	U.S.A.	...	*Practical Experience in Military Cold Starting (Digest).* (C. E. Cummings, J.S.A.E., Vol. 51, No. 2, Feb., 1943, p. 75.)
344	9331	G.B. ...	...	*General Requirements of A.C. Motor Starters—II.* (Mech. World, Vol. 113, No. 2,932, 12/3/43, p. 285.)
345	9343	U.S.A.	...	*The Importance of Accessory Equipment in Cold Starting of Diesel Engines.* (W. T. Pelizzonia, J.S.A.E., Vol. 51, No. 3, March, 1943, pp. 95-98.)
346	9508	G.B. ...	...	*Types of A.C. Motor Starters.* (Mech. World, Vol. 113, No. 2,937, 16/4/43, pp. 420-423.)
				Accessories (Air Filters, Piston Rings, etc.).
347	8978	U.S.A.	...	*Automatic Boost Control.* (Am. Av., Vol. 6, No. 18, 15/2/43, p. 37.)

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348	9072	U.S.A. ...	*The Elliott-Lysholm Supercharger (Digest).* (A. Lysholm, J.S.A.E., Vol. 51, No. 2, Feb., 1943, pp. 75-76.)
349	9039	U.S.A. ...	*Requirements for Carburettor Air Filters for Aero Engines.* (W. D. Cannon, J.S.A.E., Vol. 51, No. 2, Feb. 10, 1943, pp. 33-37 and 63.)
350	9051	U.S.A. ...	*Piston Ring Scuffing as a Criterion of Oil Performance (Digest).* (G. H. Keller, J.S.A.E., Vol. 51, No. 2, Feb. 10, 1943, p. 64.)
351	9053	U.S.A. ...	*Carburettor for the Aircraft Engine (Digest).* (F. J. Wiegand, J.S.A.E., Vol. 51, No. 2, Feb. 10, 1943, pp. 68-69.)
352	9076	U.S.A. ...	*Intercoolers and Their Performance in Aircraft (Digest).* (S. K. Anderson and P. A. Scherer, J.S.A.E., Vol. 50, No. 11, Nov., 1942, p. 60.)
353	9105	U.S.A. ...	*Relation of Shape to the Passage of Grains Through Sieves (Filters).* (G. Rittenhouse, Ind. and Eng. Chem. (Anal. Ed.), Vol. 15, No. 2, 15/2/43, pp. 153-155.)
			Turbines, Blowers, Pumps, etc.
354	9016	Germany ...	*Gas Turbine Drive for Boundary Layer Control. (Pat. series No. 2, 729,879.)* (Messerschmitt, Flugsport, Vol. 35, No. 7, 31/3/43, p. 6.)
355	9070	U.S.A. ...	*Hamilton-Whitfield Blower (Digest).* (J. E. Whitfield, J.S.A.E., Vol. 51, No. 2, Feb., 1943, p. 76.)
356	9095	G.B.	*The "Step Valve" Chemical and Proportioning Pumps.* (Engineering, Vol. 155, No. 4,030, 9/4/43, pp. 285-286.)
357	9097	G.B.	*The Heat Pump.* (J. R. Beard, Engineering, Vol. 155, No. 4,030, 9/4/43, p. 294.)
358	9099	G.B.	*Sims' Compound Pumping Engine.* (T. R. Harris, Engineering, Vol. 155, No. 4,030, 9/4/43, pp. 294-295.)
359	9304	G.B.	*The Heat Pump.* (Engineering, Vol. 155, No. 4,032, 23/4/43, p. 336.)
360	9323	G.B.	*Steam Machinery (Geared Turbines, Reciprocating Engines, The Meizer Heat Cycle).* (C. C. Pounder, Mech. World, Vol. 113, No. 2,935, 2/4/43, pp. 364-367.)
361	9332	G.B.	*Steam Generators (Contd.).* (C. C. Pounder, Mech. World, Vol. 113, No. 2,933, 19/3/43, pp. 297-299.)
362	9491	U.S.A. ...	*Rotary Pumps.* (R. J. Sweeney, J. Am. Soc. Nav. Eng., Vol. 55, No. 1, Feb., 1943, pp. 1/24.)
363	9516	G.B.	*The Production of Marine Turbine Units.* (Machinery, Vol. 62, No. 1,591, 8/4/43, pp. 374-378.)
364	9567	U.S.A. ...	*Large Forced Circulation Boiler.* (Engineer, Vol. 175, No. 4,555, 30/4/43, pp. 356-358.)
365	9661	G.B.	*Water-Tube Boiler Practice.* ((H. Pryce-Jones, J. Inst. Elect. Engs., Vol. 90, No. 26, Pt. 1, Feb., 1943, pp. 67-70.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
			Knock, Icing, Oil Consumption.
366	9040	U.S.A. ...	*New Methods for Evaluation and Recording of Piston Skirt Deposits.* (H. R. Luck and others, J.S.A.E., Vol. 51, No. 2, Feb. 10, 1943, pp. 38-44 and 63.)
367	9043	U.S.A. ...	*Control of Oil Consumption in High Speed Four-Cycle Automatic Diesel Engines (Digest).* (A. J. Stahl, J.S.A.E., Vol. 51, No. 2, Feb. 10, 1943, p. 64.)
368	9049	U.S.A. ...	*Effect of Altitude on Knock (Digest).* (D. B. Brook, J.S.A.E., Vol. 51, No. 2, Feb., 1943, p. 63.)
369	9103	U.S.A. ...	*Freezing Points, Densities and Refractive Indexes of the System Glyceral-Ethylene Glycol-Water.* (J. A. Spangler and E. C. H. Davies, Ind. and Eng. Chem (Anal. Ed.), Vol. 15, No. 2, 15/2/43, pp. 96-99.)
370	9732	G.B.	*Icing in Induction Systems.* (L. B. Kimball, Airc. Eng., Vol. 15, No. 169, March, 1943, pp. 70-75.)
			Fuels and Lubricants.
			General Developments.
371	9042	U.S.A. ...	*Development of the Co-operative Fuel Research Council.* (C. B. Veal, J.S.A.E., Vol. 51, No. 2, Feb. 10, 1943, pp. 45-51 and 63-64.)
372	9318	Sweden ...	*The Fuel Position in Sweden.* (E. A. Bell, Pet. News, Vol. 47, No. 1,191, 20/3/43, pp. 140-141.)
373	9595	G.B.	*Fuel Research Intelligence Section, issued by Fuel Research, Section E, Greenwich.* (Summary for two weeks ending 27th March and 3rd April, 1943.)
374	9751	U.S.A. ...	*Fuels and Lubricants (Abstract of Papers, S.A.E. Meeting, Oct., 1942).* (Autom. Ind., Vol. 87, No. 11, 1/12/42, pp. 31-32.)
			Petrols.
375	9505	S. Africa ...	*Ethyl Alcohol-Petrol-Benzol.* (Mech. World, Vol. 113, No. 2,937, 16/4/43, pp. 411-413.)
376	9697	G.B.	*Military Consumption of Petrol.* (Pet. Times, Vol. 47, No. 1,192, 3/4/42, p. 164.)
			Gaseous Fuels.
377	9183	G.B.	*Gas Turbines.* (Trade and Engineering Times, Vol. 52, No. 949, March, 1943, p. 30.)
378	9314	U.S.A. ...	*War Time Chemicals from Natural Gas.* (Gustav Egloff, Petroleum Times, Vol. 47, No. 1,190, 6/3/43, pp. 110-114.)
379	9316	U.S.A. ...	*War Time Chemicals from Natural Gas (Contd.).* (G. Egloff, Pet. Times, Vol. 47, No. 1,191, 20/3/43, pp. 136-137.)
380	9317	Italy	*Italy's Methane Pipe-Line System.* (E. A. Bell, Pet. News, Vol. 47, No. 1,191, 20/3/43, p. 138.)
381	9383	U.S.A. ...	*Combustion of Common Gases (Data Sheet).* (Metal Progress, Vol. 42, No. 4, Oct., 1942, p. 652.)

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			Special Fuels.
382	9312	U.S.A. ...	*New Neohexane Process.* (Nat. Pet. News, Vol. 35, No. 4, 27/1/43, p. 15.)
383	9563	G.B.	*The Burning of Creosote-Pitch Mixtures.* (Engineer, Vol. 175, No. 4,555, 30/4/43, pp. 352-354.)
384	9658	G.B.	*Influence of Water Vapour upon the Combustion of Hydrocarbon Mixtures (Moist Mixtures Give Higher Flame Temp.).* (W. T. David, Nature, Vol. 151, No. 3,831, 3/4/43, p. 392.)
			Catalytic Processes.
385	9696	G.B.	*A New Catalytic Process.* (Pet. Times, Vol. 47, No. 1,192, 3/4/43, p. 162.)
386	8981	U.S.A. ...	*New Catalytic Cracking Process for High Octane Aviation Fuel (Houdry Process).* (Nat. Pet. News, Vol. 35, No. 3, 20/1/43, p. 15.)
			Oils and Lubricants.
387	9063	U.S.A. ...	*The Effects of Diluents on the Flow Properties of Crank Case Lubricants (Digest).* (J. C. Geinesse, J.S.A.E., Vol. 51, No. 2, Feb. 10, 1943, p. 74.)
388	9263	G.B.	*I.A.E. Research on Lubrication Problems.* (Petroleum Times, Vol. 47, No. 1,184, 12/12/42, p. 598.)
389	9619	G.B.	*Dry Lubrication with Colloidal Graphite.* (Airc. Prod., Vol. 5, No. 55, May, 1943, p. 247.)
390	9700	U.S.A. ..	*The Rôle of Surface Chemistry and Profile in Boundary Lubrication.* (J. T. Burwell, S.A.E. National Aeronautics Meeting, March, 1942.)
391	9041	U.S.A. ...	*Correlation of Laboratory Oil Bench Tests with Full-Scale Engine Tests.* (C. W. George, J.S.A.E., Vol. 51, No. 2, Feb. 10, 1943, pp. 52-62.)
392	9052	U.S.A. ...	*Influence of Lubricating Oil Viscosity on Cylinder Wear (Digest).* (H. A. Eierett, J.S.A.E., Vol. 51, No. 2, Feb. 10, 1943, p. 65.)
393	9102	U.S.A. ...	*Lubricating Oil Detergency.* (S. K. Talley, Ind. and Eng. Chem. (Anal. Ed.), Vol. 15, No. 2, 15/2/43, pp. 83-90.)
394	9461	U.S.A. .	*A New High Quality Transparent Cutting Oil.* (Metal Progress, Vol. 42, No. 6, Dec., 1942, p. 1,114.)
395	9464	G.B.	*Insulating Oils for Cables.* (S. Beckinsale, J. Inst. Elect. Engs., Vol. 90, No. 13, Pt. 2, Feb., 1943, pp. 3-14.)
396	9465	G.B.	*Mineral Oil for Transformers and Switchgear.* (A. A. Pollitt, J. Inst. Elect. Engs., Vol. 90, No. 13, Pt. 2, Feb., 1943, pp. 15-22.)
397	9466	G.B.	*Insulating Oil in Relation to Circuit Breakers Failures.* (W. Fordham-Cooper, J. Inst. Elect. Engs., Vol. 90, No. 13, Pt. 2, Feb., 1943, pp. 23-28.)
398	9467	G.B.	*Maintenance of Insulating Oils in the Field.* (L. H. Welch, J. Inst. Elect. Engs., Vol. 90, No. 13, Pt. 2, Feb., 1943, pp. 29-34.)

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399	9468	G.B. ...	*Manufacture and Testing of Oil and Oil-Resin Saturants for Use in Electrical Equipment.* (A. W. Thomson and others, J. Inst. Elect. Engs., Vol. 90, No. 13, Pt. 2, Feb., 1943, pp. 35-53.)
400	9686	U.S.A. ...	*European Axis Oil Output in 1942.* (Nat. Pet. News, Vol. 35, No. 8, 24/2/43, p. 32.)
401	9727	G.B.	*Oil and the British Plastic Industry.* (G. Tugendhat, Aeronautics, Vol. 8, No. 3, April, 1943, p. 61.)
402	9853	Canada ...	*Oil Pipe Line in British Columbia.* (Engineer, Vol. 175, No. 4,552, 9/4/43, p. 292.)

Theory of Elasticity.

(Experiments with Beams, Plates, etc.)

403	8988	G.B.	*Results of Experiments on Metallic Beams Bent Beyond the Elastic Limit.* (E. Volterra, J. Inst. Civil Engs., Vol. 20, No. 5, March, 1943, pp. 1-18.)
404	9092	G.B.	*The Problem of Combined Stress.* (J. J. Guest, Engineering, Vol. 155, No. 4,030, 9/4/43, pp. 281-282.)
413	9292	G.B.	*The Problems of Combined Stress.* (J. J. Guest, Engineering, Vol. 155, No. 4,031, 16/4/43, pp. 303-304.)
414	9329	G.B.	*Cone Springs.* (Mech. World, Vol. 113, No.2,932, 12/3/43, pp. 278-280.)
415	9406	U.S.A. ...	*Temporary "Set" in Heavy Springs.* (Metal Progress, Vol. 43, No. 1, pp. 54-55, Jan., 1943.)
416	9414	U.S.A. ...	*Plasticity of Cold Metals.* (J. B. Friedmann, Metal Progress, Vol. 43, No. 1, p. 71, Jan., 1943.)
417	9460	U.S.A. ...	*Precision in Creep Testing.* (J. A. Fellows and others, Metal Progress, Vol. 42, No. 6, Dec., 1942, pp. 1,088-1,090.)
418	9510	G.B. .. .	*Analysis of Deflections of Trusses by the Method of Translations and Rotations.* (S. T. Chen and C. H. Chen, J. Inst. of Civil Engs., Vol. 20, No. 6, April, 1943, pp. 69-86.)
419	9529	G.B.	*The Effect of Grain Size on the Tensile Strength of Tin and Tin Alloys.* (W. T. Pell-Walpole, J. Inst. Metals, Vol. 69, No. 3, March, 1943, pp. 13-46.)
420	9575	G.B.	*An 11½-Year Creep Test.* (Engineering, Vol. 155, No. 4,033, 30/4/43, p. 357.)

Materials.

(A) Properties.

Al. and Mg. Alloys.

421	9023	Germany ...	*Light Alloy Lock Nut.* (*Pat. series No. 2, 730,941.*) (Aluminium, Gottingen, Flugsport, Vol. 35, No. 7, 31/3/43, p. 89.)
422	9093	G.B.	*Magnesium.* (C. H. Desch, Engineering, Vol. 155, No. 4,030, 9/4/43, pp. 284-285.)
423	9106	G.B.	*Magnesium Fires.* (Metal Industry, Vol. 62, No. 16, 16/4/43, p. 254.)

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424	9108	G.B.	*Al. Alloy Bearings.* (R. Ruedy, Metal Industry, Vol. 62, No. 16, 16/4/43, pp. 248-249.)
425	9290	G.B.	*Aluminium and its Alloys in Marine Construction.* (G. O. Taylor, Metal Industry, Vol. 62, No. 17, 23/4/43, pp. 267-268.)
426	9293	G.B.	*Magnesium.* (C. H. Desch, Engineering, Vol. 155, No. 4,031, 16/4/43, pp. 304-305.)
427	9330	G.B.	*Preventing Aluminium Threads Seizing.* (Mech. World, Vol. 113, No. 2,932, 12/3/43, p. 280.)
428	9386	U.S.A. ...	*Aluminium Alloys, Compositions, Properties and Designations of American Commercial Alloys (Chart).* (Metal Progress, Vol. 42, No. 4, Oct., 1942, p. 675.)
429	9387	U.S.A. ...	*Aluminium Bronzes Commonly Used in Aircraft (Chart).* (Metal Progress, Vol. 42, No. 4, Oct., 1942, p. 678.)
430	9411	U.S.A. ...	*Magnesium Alloys (Data Sheet).* (Metal Progress, Vol. 43, No. 1, p. 65, Jan., 1943.)
431	9504	U.S.A. ...	*Drilling Deep Holes in Magnesium Alloys.* (W. W. Gilbert, A. M. Lennie, Mech. World, Vol. 113, No. 2,937, 16/4/43, pp. 407-410.)
432	9531	G.B.	*Aluminium and its Alloys in Marine Construction, V.* (G. O. Taylor, Metal Industries, Vol. 62, No. 18, 30/4/43, pp. 274-276.)
433	9539	G.B.	*Clays for Aluminium.* (Metal Industries, Vol. 62, No. 18, 30/4/43, p. 284.)
434	9761	U.S.A. ...	*Formability of Al. Alloys Used in Aircraft Fabrication.* (G. A. Brewer, Autom. Ind., Vol. 87, No. 12, 15/12/42, pp. 32-35.)
			Non-Ferrous Metals.
435	8986	G.B.	*Bulletin of British Non-Ferrous Metals Research Association.* (No. 165, March, 1943.)
436	9004	G.B.	*The Problem of Copper and Galvanized Iron in the Same Water System.* (L. Kenworthy, J. Inst. Metals, Vol. 69, No. 2, Feb., 1943, pp. 67-90.)
437	9100	G.B.	*Co-operative Research in the Metal Industries.* (H. Moore, Engineering, Vol. 155, No. 4,030, 9/4/43, pp. 295-296.)
438	9279	G.B.	*Spot Testing of Metals (Cobalt, Nickel and Copper).* (A. Steigmann, J. Soc. Chem. and Ind., Vol. 62, No. 3, March, 1943, pp. 42-43.)
439	9280	G.B.	*Spot Testing for Lead, Mercury and Zinc.* (A. Steigmann, J. Soc. Chem. and Ind., Vol. 62, No. 3, March, 1943, pp. 43-44.)
440	9287	G.B.	*Metallurgy of Secondary Tin and Lead.* (G. E. Behr, Metal Industry, Vol. 62, No. 17, 23/4/43, pp. 261-263.)
441	9305	G.B.	*The Effect of Selenium, Tellurium and Bismuth on Copper.* (M. Cook and G. Parker, Engineering, Vol. 155, No. 4,032, 23/4/43, p. 338.)
442	9385	U.S.A. ...	*Non-Ferrous Metals (Symposium of Papers).* (Various Authors, Metal Progress, Vol. 42, No. 4, Oct., 1942, pp. 665-672.)

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443	9454	U.S.A.	...	*Spot Test for Rapid Detection of Chromium.* (W. O. Philbrook, Metal Progress, Vol. 42, No. 6, Dec., 1942, pp. 1,035-1,037.)
444	9455	U.S.A.	...	*Lead Production and its Industrial Uses.* (Metal Progress, Vol. 42, No. 6, Dec., 1942, pp. 1,039 and 1,124.)
445	9493	U.S.A.	...	*Nickel in Bronze. The Effect of Replacing Tin by Nickel on the Porosity, Mechanical Properties and Corrosion Resistance.* (A. H. Hesse and J. L. Basil, J. Am. Soc. Nav. Engs., Vol. 55, No. 1, Feb., 1943, pp. 44-71.)
446	9533	G.B.	...	*Precipitation in the Copper-Silver Alloys—I.* (Metal Industries, Vol. 62, No. 18, 30/4/43, p. 279.)
447	9566	U.S.A.	...	*Tin Alloy Steel.* (Engineer, Vol. 175, No. 4,555, 30/4/43, p. 355.)
448	9571	G.B.	...	*Effect of Selenium, Tellurium and Bismuth on Copper.* (M. Cook and G. Parker, Engineering, Vol. 155, No. 4,033, 30/4/43, p. 345.)
				Bearings and Solders.
449	9116	G.B.	...	*Centrifugally Cast Lead-Bronze Bearings.* (Metal Industry, Vol. 62, No. 15, 9/4/43, pp. 235-236.)
450	9131	U.S.A.	...	*Cast Iron Replaces Steel in Bearings.* (Ind. and Eng. Chem., Vol. 21, No. 4, 25/2/43, p. 244.)
451	9209	G.B.	...	*Oil-Retaining Bronze Bearings Replace Ball Bearings.* (Machinist, Vol. 86, No. 46, 27/2/43, p. 292 E.)
452	9334	G.B.	...	*Solder Creams and Compounds.* (Mech. World, Vol. 113, No. 2,933, 19/3/43, pp. 302-303.)
453	9401	U.S.A.	...	*Iridium Improves Bearings and Solders.* (Metal Progress, Vol. 42, No. 4, Oct., 1942, pp. 777-778.)
454	9407	U.S.A.	...	*A New Soft Solder of Lead-Arsenic-Antimony Alloy.* (R. L. Dowdell and others, Metal Progress, Vol. 43, No. 1, pp. 56-59, 96, Jan., 1943.)
455	9415	U.S.A.	...	*Fixing Bearings in Steel Shells without Using Tin.* (W. Copey, Metal Progress, Vol. 43, No. 1, p. 75, Jan., 1943.)
456	9542	Australia	...	*Note on Earlier Paper Dealing with "The Factors Governing the Adhesion of Tin-Base Bearing Metals."* (I. Laszlo, J. Inst. of Metals, Vol. 69, No. 4, April, 1943, pp. 189-190.)
				Plastics and Resins.
457	9082	U.S.A.	...	*New Application of "Panelyte" Plastic in the Aircraft Industry.* (C. R. Mahaney, J.S.A.E., Vol. 50, No. 11, Nov., 1942, p. 62.)
458	9083	U.S.A.	...	*A Schematic Procedure for Identification of Common Commercial Plastics.* (H. Nechamkin, Ind. and Eng. Chem., Vol. 15, No. 1, Jan. 13, 1943, pp. 40-41.)
459	9118	Germany	...	*Synthetic Resin Plastics for Bearings in Screw Conveyors (from Kunststaffe).* (F. Bechtold, British Plastics, Vol. 14, No. 167, April, 1943, pp. 640-644.)

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460	9119	U.S.A.	...	*Vinyl Copolymer Resin for Air-Drying Castings.* (British Plastics, Vol. 14, No. 167, April, 1943, pp. 640-644.)
461	9120	G.B.	...	*Education in the World of Plastics.* (V. E. Yarsley, British Plastics, Vol. 14, No. 167, April, 1943, pp. 648-651.)
462	9124	G.B.	...	*Plastics Printing Plates.* (British Plastics, Vol. 14, No. 167, April, 1943, p. 660.)
463	9126	U.S.A.	...	*A New Method of Moulding Plastics with a Liquid (American Patent).* (British Plastics, Vol. 14, No. 167, April, 1943, pp. 672-674.)
464	9132	U.S.A.	...	*Fatigue Resistance of Flexible Plastic Sheetings.* (F. W. Duggan and K. K. Fligor, Ind. and Eng. Chem. (Ind. Ed.), Vol. 35, No. 2, Feb., 1943, p. 172.)
465	9179	G.B.	...	*Resilitex—A New Fabric Material.* (Aeroplane, Vol. 64, No. 1,663, 9/4/43, p. 432.)
466	9192	G.B.	...	*Problem of Raw Material for Plastics.* (V. E. Yarsley, Trade and Engineering Times, Vol. 52, No. 949, March, 1943, p. 44.)
467	9203	G.B.	...	*Progress in Sheet Plastic.* (V. E. Yarsley, Trade and Engineering Times, Vol. 52, No. 948, Feb., 1943, p. 44.)
468	9212	G.B.	...	*Working with Plastics.* (J. Sasso, Machinist, Vol. 86, No. 46, 27/2/43, pp. 1,280-1,281.)
470	9341	U.S.A.	...	*Substitute Materials.* (J. G. Wood and R. F. Sanders, J.S.A.E., Vol. 51, No. 2, March, 1943, pp. 79-83.)
471	9753	U.S.A.	...	*Transparent Plastic Models Facilitate Design and Research (Connecting Rods, Crankshafts, etc.).* (Autom. Ind., Vol. 87, No. 11, 1/12/42, pp. 44 and 96.)
				Wood, Wood Plastic, Glue.
472	9032	U.S.A.	...	*Strength Characteristics of Plastic Bonded Plywood.* (G. R. Parsons, Trans. A.S.M.E., Vol. 65, No. 1, Jan., 1943, pp. 1-7.)
473	9033	U.S.A.	...	*Bearing Strength of Plastics and Plywood.* (T. Bond, Trans. A.S.M.E., Vol. 65, No. 1, Jan., 1943, pp. 9-14.)
474	9081	U.S.A.	...	*Wood Plastics in the Mass Production of Aircraft (Digest).* (C. L. Bates and H. T. Black, J.S.A.E., Vol. 50, No. 11, Nov., 1942, p. 62.)
475	9122	G.B.	...	*Gap-Filling Glues.* (British Plastics, Vol. 14, No. 167, April, 1943, pp. 656 and 691.)
476	9319	G.B.	...	*Moulded Plywood.* (J. S. Barnes, Mech. World, Vol. 113, No. 2,935, 2/4/43, pp. 350-353.)
477	9445	U.S.A.	...	*Plywood Adhesives—Characteristics and Handling Methods.* (Aviation, Vol. 42, No. 1, pp. 173-175, Jan., 1943.)
				Rubber (Nat. and Syn.).
478	9034	U.S.A.	...	*Applications and Unusual Properties of Synthetic Rubbers.* (O. D. Cole, Trans. A.S.M.E., Vol. 65, No. 1, Jan., 1943, pp. 15-20.)

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479	9101	U.S.A. ...	*Synthetic Rubber—A Spectroscopic Method for Analysis and Control.* (R. B. Barnes and others, Ind. and Eng. Chem. (Anal. Ed.), Vol. 15, No. 2, 15/2/43.)
480	9122	U.S.A. ...	*Norepol Synthetic Rubber.* (British Plastics, Vol. 14, No. 167, April, 1943, p. 658.)
481	9134	U.S.A. ...	*Orientation of Crystalline Phases on Stretching of Rubber Stocks.* (G. L. Clark and others, Ind. and Eng. Chem. (Ind. Ed.), Vol. 35, No. 2, Feb., 1943, pp. 198-204.)
482	9135	U.S.A. ...	*Properties of Rubber Solutions and Gels.* (M. L. Huggins, Ind. and Eng. Chem. (Ind. Ed.), Vol. 35, No. 2, Feb., 1943, pp. 216-220.)
483	9265	G.B. ...	*Chemistry of Synthetic Rubbers.* (Nat. Pet. News, Vol. 34, No. 41, 14/10/42, pp. 20-22.)
484	9273	G.B.	*Properties of Rubber as Used in Metal Drawing and Pressing.* (L. J. Brown, Sheet Metal Industry, Vol. 17, No. 191, March, 1941, pp. 467, 476, 496.)
485	9685	U.S.A. ...	*Synthetic Rubber Production in U.S.A.* (Nat. Pet. News, Vol. 35, No. 8, 24/2/43, pp. 20-26 and 37.)
			Dies.
486	9196	G.B.	*Plastic Dies.* (Trade and Engineering Times, Vol. 52, No. 948, Feb., 1943, p. 32.)
487	9309	G.B.	*Simple Core Mechanisms for Die Casting Dies.* (H. K. Barton, Machinery, Vol. 62, No. 1,589, 25/3/43, pp. 331-333.)
488	9398	U.S.A. ...	*Rules Governing Forging Machine Dies.* (E. R. Frost, Metal Progress, Vol. 42, No. 4, Oct., 1942, p. 756.)
489	9514	G.B.	*Future Development of the Rubber Die Press.* (W. W. MacArthur, Machinery, Vol. 62, No. 159, 8/4/43, pp. 370-371.)
490	9521	G.B.	*Press Practice with Rubber Dies (Book Review).* (Machinery, Vol. 62, No. 1,592, 15/4/43, p. 401.)
			Glass, Sapphires, Silver.
491	9015	Germany ...	*Joining Laminated Hard Glass to Metal.* (*Pat. series No. 2, 732,014.*) (Focke-Wulf, Flugsport, Vol. 35, No. 7, 31/3/43, p. 5.)
492	9194	G.B.	*The Uses of Silver in Industry.* (Trade and Engineering Times, Vol. 52, No. 948, Feb., 1943, p. 28.)
493	9204	G.B.	*New Uses for Glass.* (Trade and Engineering Times, Vol. 52, No. 948, Feb., 1943, p. 43.)
494	9288	G.B.	*Sapphire Tool Tips.* (Metal Industry, Vol. 62, No. 17, 23/4/43, p. 263.)
495	9434	U.S.A. ...	*Strength Properties of Plexiglas (Impact Strength), Pt. I.* (W. F. Bartoe, Aviation, Vol. 42, No. 1, pp. 128-135, Jan., 1943.)
496	9565	U.S.A. ...	*Organic Glass—New Transparent Resin CR. 39.* (Engineer, Vol. 175, No. 4,555, 30/4/43, p. 355.)

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			Iron and Steel.
497	9182	G.B.	*Alloy Steel Supply in U.S.* (Trade and Engineering Times, Vol. 52, No. 949, March, 1943, pp. 17-18.)
498	9289	G.B.	*Pickling of Old Roller Steel.* (Metal Industry, Vol. 62, No. 17, 23/4/43, p. 266.)
499	9321	G.B.	*Cast Iron Crankshafts.* (C. S. Darling, Mech. World, Vol. 113, No. 2,935, 2/4/43, pp. 354-357.)
500	9342	U.S.A. ...	*Production Experience in N.E. Steels.* (R. W. Roush, J.S.A.E., Vol. 51, No. 3, March, 1943, pp. 84-93.)
501	9372	U.S.A. ...	*Steels and Irons (Collection of Short Articles on American Production, etc.).* (Various authors, Metal Progress, Vol. 42, No. 4, Oct., 1942, pp. 525-588.)
502	9373	U.S.A. ...	*Specific Effects of Alloys in Steel (Chart).* (E. C. Bain, Metal Progress, Vol. 42, No. 4, Oct., 1942, p. 539.)
503	9375	U.S.A. ...	*Standard Grain Sizes for Steel (Chart).* (Metal Progress, Vol. 42, No. 4, Oct., 1942, p. 550.)
504	9379	U.S.A. ...	*Iron, Iron Carbide Equilibrium Diagram.* (Metal Progress, Vol. 42, No. 4, Oct., 1942, p. 606.)
505	9380	U.S.A. ...	*Transformation of Austenite in 0.89 per cent. Carbon Steel (Diagram).* (Metal Progress, Vol. 42, No. 4, Oct., 1942, p. 617.)
506	9393	U.S.A. ...	*Hardness Conversion Chart for Steels.* (Metal Progress, Vol. 42, No. 4, Oct., 1942, p. 723.)
507	9402	U.S.A. ...	*Equilibria for Gas-Steel Reactions (Chart).* (Metal Progress, Vol. 42, No. 4, Oct., 1942, p. 712.)
508	9408	U.S.A. ...	*Quick Immersion Technique for Molten Steel Temperatures.* (J. H. G. Monypenny, Metal Progress, Vol. 43, No. 1, pp. 67-68, Jan., 1943.)
509	9416	U.S.A. ...	*Computing Strength of Normalized Steel from its Analysis.* (F. M. Walters, Metal Progress, Vol. 43, No. 1, p. 76, Jan., 1943.)
510	9419	U.S.A. ...	*Revised List of National Emergency Alloy Steels.* (Metal Progress, Vol. 43, No. 1, p. 90, Jan., 1943.)
511	9421	U.S.A. ...	*Estimate of Steel for 1943.* (Metal Progress, Vol. 43, No. 1, pp. 100-102, Jan., 1943.)
512	9422	U.S.A. ...	*Iron and Steel in Nazi Germany.* (Metal Progress, Vol. 43, No. 1, pp. 108-118, Jan., 1943.)
513	9456	U.S.A. ...	*Defects in Cast and Wrought Steel Caused by Hydrogen.* (C. A. Zappfe, Metal Progress, Vol. 42, No. 6, Dec., 1942, pp. 1,051-1,056.)
514	9458	U.S.A. ...	*Saving Alloys in Steels by Using "Addition Agents" (Symposium of Papers).* (Metal Progress, Vol. 42, No. 6, Dec., 1942, pp. 1,061-1,069 and 1,100.)
515	9463	U.S.A. ...	*The Sponge Iron Process in the Production of Steel.* (C. Williams, Metal Progress, Vol. 42, No. 6, Dec., 1942, pp. 1,043-1,047.)
516	9517	U.S.A. ...	*Substitute Steels for Gearing.* (Machinery, Vol. 62, No. 1,591, 8/4/43, pp. 379-382.)

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517	9622	U.S.A.	...	*Magnetic Iron Aluminium Alloy (U.S. Patent).* (Airc. Prod., Vol. 5, No. 55, May, 1943, p. 248.)
518	9734	G.B. ...	...	*Practical Workshop Classification of Steels by Spark Tests.* (E. Skerry, Airc. Eng., Vol. 15, No. 169, March, 1943, pp. 83-84.)
				General Characteristics of Metals.
519	9000	G.B. ...	...	*Hardness Testing of Metals.* (Machine Tool Review, Vol. 30, No. 182, Sept.-Dec., 1942, pp. 71-74.)
520	9278	G.B. ...	...	*"Oiliness" and Surface Roughness.* (J. J. Bikerman, J. Soc. Chem. and Ind., Vol. 62, No. 3, March, 1943, pp. 41-42.)
521	9283	G.B. ...	...	*Electrode Potentials of Metals.* (A. H. Turnbull and H. C. Davis, R. and M., No. 1,901.)
522	9376	U.S.A.	...	*Rating of Inclusion ("Dirt" Chart).* (Metal Progress, Vol. 42, No. 4, Oct., 1942, p. 562.)
523	9382	U.S.A.	...	*Properties of Refractory Materials, Except Fireclay (Table).* (Metal Industry, Vol. 42, No. 4, Oct., 1942, p. 640.)
524	9384	U.S.A.	...	*Hardenability Calculated from Composition (Chart).* (M. A. Grossmann, Metal Progress, Vol. 42, No. 4, Oct., 1942, p. 660.)
525	9391	U.S.A.	...	*Ruling a Grating on Smooth Metal Reveals Hardness Variations.* (Bo. Ljuggren, Metal Progress, Vol. 42, No. 4, Oct., 1942, pp. 698-704.)
526	9395	U.S.A.	...	*Standard Tolerances for Forgings up to 100 lb.* (Metal Progress, Vol. 42, No. 4, Oct., 1942, p. 730.)
527	9462	U.S.A.	...	*Caustic Embrittlement.* (Metal Progress, Vol. 42, No. 6, Dec., 1942, pp. 1,134-1,140.)
528	9530	G.B. ...	...	*Metallurgical Abstracts (Vol. 10, Pt. 3, March, 1943, pp. 65-100).* (J. Inst. Metals, Vol. 69, No. 3, March, 1943.)
529	9543	G.B. ...	...	*Metallurgical Abstracts (Vol. 10, Part 4, April, 1943).* (J. Inst. Metals, Vol. 69, No. 4, April, 1943, pp. 101-132.)
				Corrosion.
530	9003	G.B. ...	...	*New Methods for the Examination of Corroded Metal.* (F. A. Champion, J. Inst. Metals, Vol. 69, No. 2, Feb., 1943, pp. 47-66.)
531	9036	U.S.A.	...	*Corrosion of Stressed Alloy Steel Bars by High Temperature Steel.* (H. L. Solberg and others, Trans. A.S.M.E., Vol. 65, No. 1, Jan., 1943, pp. 47-52.)
532	9050	U.S.A.	...	*Corrosion of Bearing Alloys (Digest).* (L. M. Tichvinsky, J.S.A.E., Vol. 51, No. 2, Feb., 1943, pp. 63-64.)
533	9295	G.B. ...	...	*Corrosion of Metals by Flue Gases.* (Engineering, Vol. 155, No. 4,031, 16/4/43, pp. 307-308.)
534	9303	G.B. ...	...	*Effect of Zinc on Corrosion Fatigue of Steels.* (N. Stuart and U. R. Evans, Engineering, Vol. 155, No. 4,032, 23/4/43, pp. 336-337.)
535	9340	U.S.A.	...	*Corrosion of Bearing Alloys.* (L. M. Tichvinsky, J.S.A.E., Vol. 5, No. 3, March, 1943, pp. 69-77.)

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536	9377	U.S.A.	...	*Huey Corrosion Test for 18-8 Steel.* (F. Meunier and H. M. Schnadt, Metal Progress, Vol. 42, No. 4, Oct., 1942, pp. 564-574.)
537	9457	U.S.A.	...	*Nomograph for Calculation of Corrosion Rates (Data Sheet).* (L. D. Yates and E. P. Tait, Metal Progress, Vol. 42, No. 6, Dec., 1942, p. 1,059.)
				(B) Fabrication.
				Welding, Brazing.
538	8994	U.S.A.	...	*Deep Girders Welded from Plate and Split H-Beam (Photograph).* (Engineering News Record, Vol. 128, No. 6, 5/2/42, p. 10.)
539	9264	G.B.	...	107 *Abstracts Covering Current Literature.* (Welding Lit. Review, Vol. 5, No. 1, Feb., 1943.)
540	9275	G.B.	...	*Spot Welding as Applied to Aircraft Structures.* (E. S. Jenkins, Sheet Metal Industry, Vol. 17, No. 191, March, 1941, pp. 499-501 and 516.)
541	9276	G.B.	...	*Arc Welding of Mg. Alloys.* (W. S. Loose and A. R. Orban, Sheet Metal Industry, Vol. 17, No. 191, March, 1941, pp. 503-512 and 514.)
542	9301	G.B.	...	*Repair of Drills by Welding.* (Engineering, Vol. 155, No. 4,032, 23/4/43, p. 327.)
543	9307	G.B.	...	*Machine Design for Fabricated Welded Construction.* (F. Koenigsberger, Machinery, Vol. 62, No. 1,589, 25/3/43, pp. 316-328.)
544	9315	G.B.	...	*Propane for Welding.* (Petroleum Times, Vol. 47, No. 1,190, 6/3/43, p. 116.)
545	9335	G.B.	...	*Helium-Shielded Arc Welding.* (Mech. World, Vol. 113, No. 2,932, 19/3/43, p. 311.)
546	9396	U.S.A.	...	*Welding Symbols Adopted by American Welding Society, 1941.* (Metal Progress, Vol. 42, No. 4, Oct., 1942, p. 744.)
547	9399	U.S.A.	...	*Fluxes for Oxy-Acetylene Welding and Brazing.* (H. E. Landis and F. C. Saacke, Metal Progress, Vol. 42, No. 4, Oct., 1942, p. 766.)
548	9453	U.S.A.	...	*Metallurgical Aspects of Spot Welds in Aluminium Alloys.* (J. R. Heising and E. H. Burkart, Metal Progress, Vol. 42, No. 6, Dec., 1942, pp. 1,027-1,034.)
549	9496	U.S.A.	...	*"Heliarc" Welding (from Welding J., Dec., 1942).* (T. E. Piper, J. Am. Soc. Nav. Engs., Vol. 55, No. 1, Feb., 1943, pp. 122-125.)
550	9525	U.S.A.	...	*A Wiring Template for Resistance-Welder Controls.* (Machinery, Vol. 62, No. 1,592, 15/4/43, p. 409.)
551	9526	U.S.A.	...	*"Heliarc" Welding.* (Machinery, Vol. 62, No. 1,592, 15/4/43, p. 413.)
552	9587	Canada	...	*"Heliarc" Welding.* (Canadian Aviation, Vol. 16, No. 2, Feb., 1943, pp. 92-96.)
553	9712	U.S.A.	...	*Men and Machines (Pt. II) (Drilling and Welding, etc.).* (Autom. Ind., Vol. 87, No. 6, 15/9/42, pp. 46-47 and 78-80.)
554	9745	Canada	...	*Conservation of Welding Electrode.* (Canadian Aviation, Vol. 15, No. 8, Aug., 1942, pp. 68-72.)
555	9776	U.S.A.	...	*Men and Machines (Pt. I).* (Autom. Ind., Vol. 87, No. 5, 1/9/42, pp. 40-42 and 64.)

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556	9952	G.B.	*Welding Broken Drills.* (Engineer, Vol. 175, No. 4,552, 9/4/43, p. 293.)
			Surface Treatment.
557	9075	U.S.A. ...	*Metal Spraying for Reclamation of Automotive Parts (Digest).* (H. S. Ingham and J. E. Wakefield, J.S.A.E., Vol. 50, No. 11, Nov., 1942, pp. 59 and 62.)
558	9109	G.B.	*Conservation of Tin.* (Metal Industry, Vol. 62, No. 16, 16/4/43, p. 249.)
559	9110	G.B.	*Electrodeposition of Silver on Magnesium.* (F. J. Bowen and L. I. Gilbertson, Metal Industry, Vol. 62, No. 16, 16/4/43, p. 252.)
560	9129	U.S.A. ...	*Luminous Paints.* (Ind. and Eng. Chem., Vol. 21, No. 4, 25/2/43, p. 277.)
561	9274	G.B.	*Coating by the Electric Spray Method.* (H. Ransburg, Sheet Metal Industry, Vol. 17, No. 191, March, 1941, pp. 445-447.)
562	9410	U.S.A. ...	*Uses of Replica Coatings in Metallography.* (J. I. Wexlin, Metal Progress, Vol. 43, No. 1, p. 69, Jan., 1943.)
563	9528	G.B.	*Surface Protection of Magnesium Alloys.* (N. Parkinson and J. W. Cuthbertson, J. Inst. Metals, Vol. 69, No. 3, March, 1943, pp. 109-130.)
564	9534	G.B.	*"Throwing Power" of Plating Solutions.* (C. B. F. Young and Al. Zminkaski, Metal Industry, Vol. 62, No. 18, 30/4/43, pp. 280-282.)
565	9620	G.B.	*Testing Tin Coatings.* (Airc. Prod., Vol. 5, No. 55, May, 1943, p. 248.)
566	9950	G.B.	*Plastic Treatment for Porous Castings.* (Engineer, Vol. 175, No. 4,552, 9/4/43, p. 293.)
			Heat Treatment and Furnaces.
567	9002	G.B.	*Heat Treatment Equipment.* (Machine Tool Review, Vol. 30, No. 182, Sept.-Dec., 1942, pp. 86-87.)
568	9111	G.B.	*Flowing of Tin by Induction Heating.* (G. E. Stoltz, Metal Industry, Vol. 62, No. 16, 16/4/43, pp. 251-252.)
569	9213	G.B.	*Controlled Heat Treating Atmospheres, I and II.* (Machinist, Vol. 86, No. 46, 27/2/43, p. 1,298 a.)
570	9281	G.B.	*Electric Furnace.* (J. Sci. Insts., Vol. 20, No. 2, Feb., 1943, p. 33.)
571	9311	G.B.	*Heat Treatment of the Wrought Aluminium Alloys (Part I—Practice).* (Bull. No. 3, issued by Wrought Light Alloys Development Ass.)
572	9322	G.B.	*Tin Economy by Induction Heating.* (Mech. World, Vol. 113, No. 2,935, 2/4/43, p. 362.)
573	9378	U.S.A. ...	*Furnaces and Heat Treatment (Symposium of Papers).* (Various Authors, Metal Progress, Vol. 42, No. 4, Oct., 1942, pp. 591-660.)
574	9417	U.S.A. ...	*Heat Treating for Machinability.* (L. E. Webb, Metal Progress, Vol. 43, No. 1, pp. 87-89, Jan., 1943.)

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375	9420	U.S.A.	... *Simple Apparatus for Sorting Heat-Treated Ferrous Parts from Untreated Parts.* (R. J. Brown, Metal Progress, Vol. 43, No. 1, p. 92, Jan., 1943.)
376	9424	U.S.A.	... *Heat Treating Tray.* (Metal Progress, Vol. 43, No. 1, p. 122, Jan., 1943.)
377	9425	U.S.A.	... *Local Heating by Electrical Induction.* (Metal Progress, Vol. 43, No. 1, p. 124, Jan., 1943.)
378	9538	G.B. ...	... *Heat Treatment of Aluminium.* (Metal Industry, Vol. 62, No. 18, 30/4/43, p. 284.)
379	8999	G.B. ...	... *Solid Coal Firing for Metallurgical Furnaces.* (Machine Tool Review, Vol. 30,, No. 182, Sept.-Dec., 1942, pp. 69-70.)
			Flame-Cutting and Hardening.
380	9035	U.S.A.	... *Analytical Investigation of Metal Cutting with Abrasive (Suggestions for Research).* (W. B. Heinz, Trans. A.S.M.E., Vol. 65, No. 1, Jan., 1943, pp. 21-29.)
381	9132	G.B. ...	... *Flame Cutting of Armour Plate.* (Engineer, Vol. 175, No. 4,552, 9/4/43, pp. 296-297.)
382	9298	G.B. ...	... *Flame Cutting of Rolled Armour Plate.* (Engineering, Vol. 155, No. 4,031, 16/4/43, p. 316.)
383	9509	G.B. ...	... *Rolled Armour Plate (Bulletin on Machine Flame Cutting).* (Mech. World, Vol. 113, No. 2,937, 16/4/43, p. 423.)
384	9513	G.B. ...	... *The Flame Hardening Process.* (Machinery, Vol. 62, No. 1,591, 8/4/43, p. 365.)
385	9537	G.B. ...	... *Machine Flame Cutting of Rolled Armour Plate (Issued by the Min. of Supply).* (Metal Industry, Vol. 62, No. 18, 30/4/43, p. 283.)
			Machining, Polishing, etc.
386	9114	G.B. ...	... *Machining Al. and its Alloys.* (R. L. Templin, Metal Industry, Vol. 62, No. 15, 9/4/43, pp. 231-233.)
387	9306	G.B. ...	... *Machining Operations on Locomotive Parts.* (Machinery, Vol. 62, No. 1,589, 25/3/43, pp. 309-312.)
388	9392	U.S.A.	... *Electrolytic Polishing of Metals (Chart).* (G. E. Pellissier, Metal Progress, Vol. 42, No. 4, Oct., 1942, p. 709.)
389	9400	U.S.A.	... *Metal Cleaning and Finishing (Symposium of Papers).* (Metal Progress, Vol. 42, No. 4, Oct., 1942, p. 773.)
390	9535	G.B. ...	... *Polishing Methods Prior to Plating.* (Metal Industry, Vol. 62, No. 18, 30/4/43, p. 282.)
391	9653	U.S.A.	... *Standard Surface Finishes.* (W. J. Darmondy, Army Ordnance, Vol. 24, No. 136, Jan.-Feb., 1943, pp. 99-101.)
392	9666	U.S.A.	... *Machining Fine Conical Points.* (M. Hall, Machinist, Vol. 86, No. 44, 13/2/43, p. 276 E.)
			Extrusion, Stamping, Rolling-in.
393	9001	G.B. ...	... *Cecostamping—A New Technique in Presswork.* (Machine Tool Review, Vol. 30, No. 182, Sept.-Dec., 1942, pp. 73-79.)

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594	9037	U.S.A.	...	*Automatic Uniform Rolling-in of Small Tubes.* (F. F. Fisher and E. T. Cope, Trans. A.S.M.E., Vol. 65, No. 1, Jan., 1943, pp. 53-60.)
595	9077	U.S.A.	...	*Impact Extrusion and Cold Pressing of Aeroplane Parts (Digest).* (P. Krenig, J.S.A.E., Vol. 50, No. 11, Nov., 1942, pp. 60-61.)
596	9333	G.B.	...	*A New Electrolytic Etching Process.* (Mech. World, Vol. 113, No. 2,933, 19/3/43, p. 302.)
				Casting.
597	8970	Germany	...	*Alloy Steel Castings, Their Properties and Field of Application.* (H. Juretzek, Giesserei, Vol. 29, 1942, pp. 217-226 and 243-249.)
598	9113	G.B.	...	*The Sand-Casting of Magnesium Alloys.* (F. A. Fox, Metal Industry, Vol. 62, No. 15, 9/4/43, pp. 226-230.)
599	9121	G.B.	...	*Salvage of Porous Castings.* (British Plastics, Vol. 14, No. 167, April, 1943, pp. 652 and 688.)
600	9286	G.B.	...	*Centrifugal Casting—I.* (H. B. Zuehlke, Metal Industry, Vol. 62, No. 17, 23/4/43, pp. 258-260.)
601	9532	G.B.	...	*Centrifugal Casting—II.* (H. B. Zuehlke, Metal Industry, Vol. 62, No. 18, 30/4/43, pp. 277-279.)
				Powder Metallurgy.
602	9115	G.B.	...	*Powder Metallurgy.* (W. D. Jones, Metal Industry, Vol. 62, No. 15, 9/4/43, p. 237.)
603	9325	G.B.	...	*Powder Metallurgy—its Products and Their Various Applications.* (W. D. Jones, Mech. World, Vol. 113, No. 2,922, 12/3/43, pp. 269-272.)
604	9409	U.S.A.	...	*Iron Powder.* (C. Hardy, Metal Progress, Vol. 43, No. 1, pp. 62-64, 126, Jan., 1943.)
				Machines.
605	9404	U.S.A.	...	*Plastic Punches for Drop Hammer and Hydraulic Press.* (Aero Digest, Vol. 42, No. 2, pp. 121-128, Feb., 1943.)
606	9423	U.S.A.	...	*New Hydraulic Press.* (Metal Progress, Vol. 43, No. 1, p. 122, Jan., 1943.)
607	9522	G.B.	...	*A Revolving Lathe Steady.* (E. J. Pratt, Machinery, Vol. 62, No. 1,592, 15/4/43, p. 403.)
608	9597	G.B.	...	*Spar Milling—A New Machine Incorporating Hydraulic Copying Mechanism and Automatic Variable Feeds.* (Aire. Prod., Vol. 5, No. 55, May, 1943, pp. 230-233.)
609	9667	G.B.	...	*Precision Filing and Sawing Machine.* (B. Elliott, Machinist, Vol. 86, No. 44, 13/2/43, pp. 277-278.)
				Tools.
610	8998	G.B.	...	*Maintenance of Cutting Tools.* (Machine Tool Review, Vol. 30, No. 182, Sept.-Dec., 1942, pp. 66-69.)
611	9320	G.B.	...	*Cutting-Tool Life and Efficiency (Official Recommendations).* (Mech. World., Vol. 113, No. 2,935, 2/4/43, pp. 352-353.)
612	9374	U.S.A.	...	*Tool Steels Classified by Wear Toughness Ratio (Data Sheet).* (H. B. Chambers, Metal Progress, Vol. 42, No. 4, Oct., 1942, p. 542.)

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613	9397	U.S.A.	...	*Tool Steels for Hot Working Iron and Steel.* (H. E. Replogle, Vol. 42, No. 4, Oct., 1942, p. 750.)
614	9572	G.B.	...	*Holders for Ardoloy Cutting Tools.* (Engineering, Vol. 155, No. 4,033, 30/4/43, p. 347.)
615	9648	U.S.A.	...	*Conserving Tool Steels.* (Army Ordnance, Vol. 24, No. 137, March-April, 1943, pp. 330-331.)
616	9664	U.S.A.	...	*Maintenance of Press Tools—1.* (H. R. Hageman, Machinist, Vol. 86, No. 44, 13/2/43, pp. 1,216-1,217.)
				Miscellaneous.
617	9112	G.B.	...	*Colloidal Graphite as a Lubricant in Metal Working.* (E. A. Smith, Metal Industry, Vol. 62, No. 16, 16/4/43, p. 250.)
618	9308	G.B.	...	*Sciencal Grinding Fluid.* (Machinery, Vol. 62, No. 1,589, 25/3/43, p. 330.)
619	9381	U.S.A.	...	*Cooling Power of Quenching Baths (Curves whereby Severity of Quench can be Estimated).* (Metal Progress, Vol. 42, No. 4, Oct., 1942, p. 622.)
620	9394	U.S.A.	...	*Metal Working (Symposium of Papers).* (Metal Progress, Vol. 42, No. 4, Oct., 1942, pp. 727-740.)
				(C) Inspection.
				X-Ray.
621	9536	G.B.	...	*Industrial X-Ray Unit.* (Metal Industry, Vol. 62, No. 18, 30/4/43, p. 282.)
622	9540	G.B.	...	*The Structure of Rolled and Annealed Aluminium as Revealed by X-Ray.* (E. E. Spillett, J. Inst. of Metals, Vol. 69, No. 4, April, 1943, pp. 149-175.)
623	9541	G.B.	...	*An X-Ray Study of the Transformation of Cobalt.* (O. Edwards and H. Lipson, J. Inst. of Metals, Vol. 69, No. 4, April, 1943, pp. 177-178.)
624	9766	U.S.A.	...	*X-Ray Technique in Foundry Works.* (Autom. Ind., Vol. 87, No. 12, 15/12/42, pp. 46 and 86.)
				Electrographic, Photometric, etc.
625	9087	U.S.A.	...	*Electrographic Detection of Molybdenum in Steel Alloys.* (J. A. Calamari and others, Ind. and Eng. Chem., Vol. 15, No. 1, 13/1/43, p. 71.)
626	9088	U.S.A.	...	*Micro-Determination of Carbon in Steels.* (E. W. Balis and others, Ind. and Eng. Chem., Vol. 15, No. 1, 13/1/43, pp. 68-69.)
627	9104	U.S.A.	...	*Quantitative Spectrographic Analysis of Stainless Steels.* (M. F. Hasler and C. E. Harvey, Ind. and Eng. Chem. (Anal. Ed.), Vol. 15, No. 2, 15/2/43, pp. 102-107.)
628	9117	G.B.	...	*Detecting Discontinuities by the Fluorescent Method.* (T. de Forest, Metal Industry, Vol. 62, No. 15, 9/4/43, pp. 233-234.)
629	9277	G.B.	...	*Rapid Photometric Determination of Cobalt in Steels.* (F. W. Haywood and A. A. R. Wood, J. Soc. Chem. and Ind., Vol. 62, No. 3, March, 1943, pp. 37-39.)

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630	9388	U.S.A. ...	*Testing v. Control Instruments (Symposium of Papers).* (Various Authors, Metal Progress, Vol. 42, No. 4, Oct., 1942, pp. 687-696.)
631	9412	U.S.A. ...	*Magnetic Balance for Inspection.* (A. V. de Forest, Metal Progress, Vol. 43, No. 1, p. 69, Jan., 1943.)
632	9413	U.S.A. ...	*Metallography by Electron Microscope.* (D. Harker and V. J. Schaefer, Metal Progress, Vol. 43, No. 1, pp. 68-69, Jan., 1943.)
633	9459	U.S.A. ...	*Electrographic Methods of Surface Analysis.* (M. S. Hunter and others, Metal Progress, Vol. 42, No. 6, Dec., 1942, pp. 1,070-1,076.)
634	9500	U.S.A. ...	*Fluorescent Magnetic Inspection (from Metals and Alloys, Nov., 1942).* (J. Am. Soc. Nav. Engs., Vol. 55, No. 1, Feb., 1943, pp. 169-173.)
635	9501	U.S.A. ...	*Sodium Light for Microscopic Flaw Detection.* (J. Am. Soc. Nav. Engs., Vol. 55, No. 1, Feb., 1943, p. 181.)
636	9574	G.B.	*The "Hyglo" Crack Detection Process.* (Engineering, Vol. 155, No. 4,033, 30/4/43, p. 357.)

Instruments.

Aircraft.

637	9360	U.S.A. ...	*Vultee Flight Test Recorder (Wireless Transmission of Inst. Readings).* (Aero Digest, Vol. 42, No. 2, pp. 255-262, Feb., 1943.)
638	*9439	U.S.A. ...	*A Radio Flight Test Recorder Developed by Vultee Aircraft Co.* (Aviation, Vol. 42, No. 1, p. 163, Jan., 1943.)

Stress-Strain Measuring.

640	9328	G.B.	*Lindley Extensometer for Determination of Proof Stress, etc.* (Mech. World, Vol. 113, No. 2,932, 12/3/42, p. 276.)
641	9763	U.S.A. ...	*Application of the Electric Strain Gauge in Aircraft Structural Design.* (Autom. Ind., Vol. 87, No. 12, 15/12/42, pp. 40-42 and 64.)

Optical.

642	9180	G.B.	*The Binomag Binocular Magnifier.* (Aeroplane, Vol. 64, No. 1,663, 9/4/43, p. 432.)

Rotameter, Balances, Gauges.

643	9084	U.S.A. ...	*A Versatile Continuous Reading Thermionic Voltmeter.* (L. J. Anderson and J. C. Hindman, Ind. and Eng. Chem., Vol. 15, No. 1, 13/1/43, pp. 42-45.)
644	9085	U.S.A. ...	*Simple Automatic and Recording Balance.* (N. W. Muller and R. E. Peck, Ind. and Eng. Chem., Vol. 15, No. 1, 13/1/43, pp. 46-48.)
645	9086	U.S.A. ...	*An Instrument for Making Uniform Films by the Dip Method.* (H. F. Payne, Ind. and Eng. Chem., Vol. 15, No. 1, 13/1/43, pp. 48-56.)
646	9336	U.S.A. ...	*Glass Gauges.* (F. J. Oliver, The Iron Age, 4/2/43, pp. 35-39 and 98, 100.)

* Abstract available.

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647	9350	U.S.A.	... *High-Voltage Air Filter for Removing Oil Vapour in Machine Shop.* (Aero Digest, Vol. 42, No. 2, pp. 331-332, Feb., 1943.)
648	9352	U.S.A.	... *Technical Aspects of Rotameters.* (W. J. Diament, Aero Digest, Vol. 42, No. 2, pp. 138-142, Feb., 1943.)
649	9649	U.S.A.	... *Glass Precision Gauges.* (Army Ordnance, Vol. 24, No. 137, March-April, 1943, pp. 331-332.)
650	9719	U.S.A.	... *The Space Time Recorder.* (F. N. M. Brown, 10th Annual Meeting of the Institute Aeronautical Sciences, Jan., 1943.)
			Conversion Tables and Charts.
651	9370	U.S.A.	... *Conversion Table for Lengths.* (C. Hering, Metal Progress, Vol. 42, No. 4, Oct., 1942, p. 522 V.)
652	9371	U.S.A.	... *Temperature Conversion (Table).* (Metal Progress, Vol. 42, No. 4, Oct., 1942, p. 522 X.)
653	9389	U.S.A.	... *Psychometric Chart, High Range.* (Metal Progress, Vol. 42, No. 4, Oct., 1942, p. 689.)
654	9390	U.S.A.	... *Psychometric Chart, Low Range.* (Metal Progress, Vol. 42, No. 4, Oct., 1942, p. 692.)
655	9498	U.S.A.	... *Classification of Relays (from Product Engineering, Oct.-Nov., 1942).* (R. B. Immel, J. Am. Soc. Nav. Engs., Vol. 55, No. 1, Feb., 1943, pp. 131-144.)

Production.

			Organisation and Planning.
656	9181	G.B. ...	... *Industrial Planning—VII.* (G. W. Beale, Trade and Engineering Times, Vol. 52, No. 949, March, 1943, p. 12.)
657	9193	G.B. ...	... *Production Planning—VI.* (G. W. Beale, Trade and Engineering Times, Vol. 52, No. 948, Feb., 1943, p. 12.)
658	9210	G.B. ...	... *Redesign to Simplify Production.* (J. Haydock, Machinist, Vol. 86, No. 46, 27/2/43, pp. 1,277-1,279.)
659	9268	G.B. ...	... *Production in Small Factories.* (Mech. World, Vol. 113, No. 2,928, 12/2/43, pp. 178-179.)
660	9327	G.B. ...	... *Organisation and Working of Joint Production Committees in the United States.* (Mech. World, Vol. 113, No. 2,932, 12/3/42, p. 273.)
661	9363	U.S.A.	... *Production Control of Design Changes.* (J. D. Robbins, Aero Digest, Vol. 42, No. 2, pp. 215-216, 271, Feb., 1943.)
662	9512	G.B. ...	... *Organisation and Execution of Engineering Work.* (C. J. S. King, J. Inst. of Civil Engs., Vol. 20, No. 6, April, 1943, pp. 115-141.)
663	9524	G.B. ...	... *Flexibility in Detail Production.* (I. Cohen, Machinery, Vol. 62, No. 1,592, 15/4/43, pp. 408-409.)
664	9560	G.B. ...	... *Time and the Production of Mechanisms.* (Engineer, Vol. 175, No. 4,555, 30/4/43, pp. 342-344.)
665	9706	India	... *Indian War Shops.* (J. R. Custer, Autom. Ind., Vol. 87, No. 6, 15/9/42, pp. 26-28.)

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666	9710	U.S.A. ...	*Pierce Governor Co. Surmounts Production Problems Due to War.* (J. Geschelin, Autom. Ind., Vol. 87, No. 6, 15/9/42, pp. 36-45.)
667	9768	G.B.	*Problems of Shift Working in a General Engineering Factory.* (J. Inst. Prod. Engs., Vol. 22, No. 2, Feb., 1943, pp. 41-59.)
668	9773	U.S.A. ...	*War Production (General Motor Corp.).* (Autom. Ind., Vol. 87, No. 5, 1/9/42, pp. 30-33 and 64.)
			Research and Training.
669	8971	G.B.	*A Survey of Selection and Allocation for Engineering Occupations.* (F. Holliday, J. Inst. Prod. Engs., Vol. 22, No. 3, March, 1943, pp. 103-136.)
670	8972	G.B.	*The Young Production Engineer—His Training and Prospects (with Discussion).* (J. D. Scaife and F. P. Liebert, J. Inst. Prod. Eng., Vol. 22, No. 3, March, 1943, pp. 69-102.)
671	9133	U.S.A. ...	*Research and Patents.* (R. E. Wilson, Ind. and Eng. Chem. (Ind. Ed.), Vol. 35, No. 2, Feb., 1943, pp. 177-185.)
672	9136	U.S.A. ...	*What is Research?* (L. T. Work, Ind. and Eng. Chem. (Ind. Ed.), Vol. 35, No. 2, Feb., 1943, pp. 221-222.)
673	9137	U.S.A. ...	*Research Accounting.* (D. H. Sheehan and F. J. Curtis, Ind. and Eng. Chem. (Ind. Ed.), Vol. 35, No. 2, Feb., 1943, pp. 225-226.)
674	9269	G.B.	*Industrial Research in Great Britain.* (Mech. World, Vol. 113, No. 2,928, 12/2/42, pp. 180-181.)
675	9297	G.B.	*Co-operative Research in the Metal Industries.* (H. Moore, Engineering, Vol. 155, No. 4,031, 16/4/43, pp. 315-316.)
676	9299	G.B.	*The Chemical Engineer in Reconstruction.* (C. S. Garland, Engineering, Vol. 155, No. 4,031, 16/4/43, pp. 316-317.)
677	9432	U.S.A. ...	*Visual Aids for Mechanical Training.* (L. S. Metcalfe, Aviation, Vol. 42, No. 1, pp. 269, 347, Jan., 1943.)
678	9527	G.B.	*Co-operative Research in the Metal Industries.* (H. Moore, J. Inst. Metals, Vol. 69, No. 3, March, 1943, pp. 93-108.)
679	9562	G.B.	*The Sigmund Apprentice Training Scheme.* (Engineer, Vol. 175, No. 4,555, 30/4/43, pp. 348-349.)
680	9593	U.S.A. ...	*Standardisation—Work and Procedure of the U.S. Aeronautical Board.* (Airc. Prod., Vol. 5, No. 55, May, 1943, p. 218.)
681	9772	U.S.A. ...	*Caterpillar Tractor Co. Research in Vital Metals.* (Autom. Ind., Vol. 87, No. 5, 1/9/42, pp. 25 and 70-71.)
			Aircraft Production.
682	9146	U.S.A. .	*Lockheed Production.* (Flight, Vol. 43, No. 1,790, 15/4/43, pp. 398-399.)
683	9166	U.S.A. ..	*America's Aircraft Industry.* (Aeroplane, Vol. 64, No. 1,663, 9/4/43, p. 409.)

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684	9185	G.B. ...	*Aircraft Production.* (Trade and Engineering Times, Vol. 52, No. 949, March, 1943, pp. 31-32.)
685	9267	G.B.	*Power Plant and Works Equipment.* (Mech. World, Vol. 113, No. 2,928, 12/2/43, p. 167.)
686	9338	U.S.A. ...	*S.A.E. Manual of Aircraft Engine Drafting Room Practice (Review).* (J.S.A.E., Vol. 51, No. 3, March, 1943, p. 22.)
687	9346	U.S.A. ...	*The Effect of 1943 Aircraft Production on the War.* (J. A. Ward, Aero Digest, Vol. 42, No. 2, pp. 83-86, 285, 348-349, Feb., 1943.)
688	9354	U.S.A. ...	*Production of Tapered Landing Gear Tubing.* (J. P. Dods, Aero Digest, Vol. 42, No. 2, pp. 149-150, 348, Feb., 1943.)
689	9358	U.S.A. ...	*Production of Packard Merlin.* (F. M. Reck, Aero Digest, Vol. 42, No. 2, pp. 164-168, 303-305, Feb., 1943.)
690	9431	U.S.A. ...	*Good Testing Simplifies Production of Flying Fortresses.* (B. K. Bucey, Aviation, Vol. 42, No. 1, pp. 107-111, 221, Jan., 1943.)
691	9441	U.S.A. ...	*Salvage of Damaged Propellers at Hamilton Standard Propellers Division.* (Aviation, Vol. 42, No. 1, p. 165, Jan., 1943.)
692	9586	Canada ...	*Producing Aircraft Instruments in Canada.* (Canadian Aviation, Vol. 16, No. 2, Feb., 1943, pp. 87-92.)
693	9591	U.S.A. ...	*Vega Methods for Ventura Assembly.* (Airc. Prod., Vol. 5, No. 55, May, 1943, pp. 207-210.)
694	9594	G.B.	*Aircraft Sheet Metal Work (Production of Equipment for Bristol Engines).* (W. E. Goff, Airc. Prod., Vol. 5, No. 55, May, 1943, pp. 219-229.)
695	9599	Canada ...	*Canadian Mosquito Production (Photograph).* (Airc. Prod., Vol. 5, No. 55, May, 1943, pp. 243.)
696	9621	U.S.A. ...	*Ford Methods for Grinding Cylinder Barrels (Reduction in Grinding Time).* (Airc. Prod., Vol. 5, No. 55, May, 1943, p. 248.)
697	9623	G.B.	*Engraving for the Aircraft Industry.* (Airc. Prod., Vol. 5, No. 55, May, 1943, pp. 249-251.)
698	9738	Canada ...	*Step-by-Step Overhaul of Aircraft.* (Canadian Aviation, Vol. 15, No. 8, Aug., 1942, pp. 34-35 and 76.)
699	9739	Canada ...	*"Strip to the Bones" Overhaul in Winnipeg Aircraft Plant.* (Canadian Aviation, Vol. 15, No. 8, Aug., 1942, pp. 36-37 and 76.)
700	9743	Canada ...	*Monorail Conveyor Speeds Output of Fuselages.* (E. P. Kennedy, Canadian Aviation, Vol. 15, No. 8, Aug., 1942, pp. 60 and 64.)
701	9748	U.S.A. ...	*Stinson-Built Planes for U.S. Army Liaison Work.* (Autom. Ind., Vol. 87, No. 11, 1/12/42, p. 25.)
702	9757	U.S.A. ...	*Propellers in the Making (Nash-Kelvinator Plant).* (J. Geschelin, Autom. Ind., Vol. 87, No. 12, 15/12/42, pp. 20-25, 72-74.)
703	9774	G.B.	*Spitfire V Fighter in Production.* (Autom. Ind., Vol. 87, No. 5, 1/9/42, pp. 34-37 and 72.)

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704	9775	G.B.	...	*Production Equipment for Rolls Royce Engines.* (Autom. Ind., Vol. 87, No. 5, 1/9/42, pp. 38-39.)
				Other War Material Production.
705	9046	U.S.A.	...	*S.A.E. War Production Meeting, Jan.*, 1943. (*Digests of Papers on American Combat Vehicles, Steel Cartridge Cases, Surface Finish in Guns and Shell Manufacture.*) (J.S.A.E., Vol. 51, No. 2, Feb. 10, 1943, pp. 57-61.)
706	9426	U.S.A.	...	*List of Manufacturing Firms in U.S.A.* (*Separate Supplement*). (Metal Progress, Vol. 43, No. 1, pp. C1-C63, Jan., 1943.)
707	9482	Japan	...	*Japanese Machine Tool Production and New Method of Producing Aluminium.* (Flight, Vol. 43, No. 1,792, 29/4/43, p. 445.)
708	9520	G.B.	...	*The Production of Automatic Pistols.* (Machinery, Vol. 62, No. 1,592, 15/4/43, pp. 393-400.)
709	9705	U.S.A.	...	*Production of Jeep Shells and Forgings.* (J. Geschelin, Autom. Ind., Vol. 87, No. 6, 15/9/42, pp. 20-25.)
710	9954	S. Africa	...	*South African War Industry* (*Tanks, Guns, etc.*). (Engineer, Vol. 175, No. 4,552, 9/4/43, p. 296.)
				Special Methods.
711	9060	U.S.A.	...	*Production Applications of Flash Welding* (*Digest*). (R. Milmore, J.S.A.E., Vol. 51, No. 2, Feb., 10, 1943, p. 73.)
712	9078	U.S.A.	...	*The Place in Spot Welding and Design and Production of Aircraft* (*Digest*). (G. S. Mikhalapov, J.S.A.E., Vol. 50, No. 11, Nov., 1942, p. 61.)
713	9266	G.B.	...	*Weld Forging—an Aid to Production.* (J. Winning, Mech. World, Vol. 113, No. 2,928, 12/2/43, pp. 159-162.)
714	9362	U.S.A.	...	*Arc Welding Aircraft Structures.* (W. S. Evans, Aero Digest, Vol. 42, No. 2, pp. 200-210, 355-357, Feb., 1943.)
715	9080	U.S.A.	...	*Template Duplication by Dry Offset Printing.* (W. A. Collins and J. T. Barnes, J.S.A.E., Vol. 50, No. 11, Nov., 1942, p. 61.)
716	9107	G.B.	...	*Core Sand Reclamation* (*Wright Production*). (W. A. Phair, Metal Industry, Vol. 62, No. 16, 16/4/43, pp. 246-248.)
717	9351	U.S.A.	...	*Lofting Problems of Streamline Bodies* (*X*). (C. M. Hartley, R. A. Liming, Aero Digest, Vol. 42, No. 2, pp. 130-136, Feb., 1943.)
718	9367	U.S.A.	...	*Details of Duramold Fabrication.* (S. M. Fairchild, Aero Digest, Vol. 42, No. 2, pp. 232-239.)
719	9405	U.S.A.	...	*Forming Propeller Shanks by Induction Heating.* (Aero Digest, Vol. 42, No. 2, pp. 314-315, Feb., 1943.)
720	9433	U.S.A.	...	*Theory and Technique of Perspective Projection* (*Pt. I*). (G. F. Bush, Aviation, Vol. 42, No. 1, pp. 118-120, 125, 349, Jan., 1943.)
721	9436	U.S.A.	...	*Drop Hammer Technique.* (C. J. Frey and S. S. Kogut, Aviation, Vol. 42, No. 1, pp. 143-149, Jan., 1943.)

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722	9442	U.S.A. ...	*Wiring Board Speeds Harness Assembly.* (Aviation, Vol. 42, No. 1, p. 165, Jan., 1943.)
723	9446	U.S.A. ...	*Metallizing for Better Maintenance.* (L. E. Kunkler, Aviation, Vol. 42, No. 1, pp. 231-235, 342-344, Jan., 1943.)
724	9503	G.B.	*Clamping Cylindrical Components.* (Mech. World, Vol. 113, No. 2,937, 16/4/43, pp. 403-406.)
725	9507	G.B.	*Easily Made Duct Bends.* (Mech. World, Vol. 113, No. 2,937, 16/4/43, p. 418.)
726	9515	G.B.	*Improving Hack Saw Machine Output.* (Machinery, Vol. 62, No. 1,591, 8/4/43, p. 373.)
727	9523	G.B.	*The Three-Circle Problem (for Cam Design).* (Machinery, Vol. 62, No. 1,592, 15/4/43, pp. 404-407.)
728	9747	U.S.A. ...	*Ford War Plant Facilities Straight-Line Production.* (J. Geschelin, Autom. Ind., Vol. 87, No. 11, 1/12/42, pp. 19-24.)
729	9756	U.S.A. ...	*New Quenching Method Used at Ford Armourplate Plant.* (Autom. Ind., Vol. 87, No. 11, 1/12/43, p. 52.)
730	9770	G.B.	*Report on De-Skilling and Up-Grading for Machine Setting.* (The Technical Bulletin, No. 21,, Feb., 1943, pp. 211-221.) (J. Inst. Prod. Engs., Vol. 21, No. 2, Feb., 1943.)
			Special Equipment.
731	9011	Germany ...	*Simple Device for Checking Curvature of Sheet Metal Profiles Against Lofting Contours.* (Junkers, Flugsport, Vol. 35, No. 7, 31/3/43, pp. 81-82.)
732	9588	U.S.A. ...	*Automatic Spray Gun for Painting Aircraft Parts.* (Canadian Aviation, Vol. 16, No. 2, Feb., 1943, pp. 99-100.)
733	9750	U.S.A. ...	*Modern Equipment at the Ramsey Plant (Aviation Piston Rings Manufacture).* (Autom. Ind., Vol. 87, No. 11, 1/12/42, pp. 34-37.)
734	9755	U.S.A. ...	*New Production Equipment for Aircraft Assembly.* (Autom. Ind., Vol. 87, No. 11, 1/12/43, p. 48.)
735	9765	U.S.A. ...	*New Production Equipment.* (Autom. Ind., Vol. 87, No. 12, 15/12/42, pp. 44-45.)
736	9771	U.S.A. ...	*Clark Manufacturing Facilities (Fabrication of Axle Housings).* (J. Geschelin, Autom. Ind., Vol. 87, No. 5, 1/9/42, pp. 20-24 and 67.)
			Inspection and Quality Control.
737	9208	G.B.	*Dimensional Tolerances and Quality Control.* (J. W. White, Machinist, Vol. 86, No. 46, 27/2/43, pp. 288 E-289 E.)
738	9282	G.B.	*Universal Dial Gauges for Toolshop Inspection.* (J. Sci. Insts., Vol. 20, No. 2, Feb., 1943, p. 34.)
739	9450	G.B.	*Quality Assurance Through Sampling Inspection—I.* (H. Rissik, Engineer, Vol. 175, No. 4,554, 23/4/43, p. 334.)
740	9518	U.S.A. ...	*Fluorescent Tubular Lighting for Inspection Work.* (Machinery, Vol. 62, No. 1,591, 8/4/43, p. 380.)

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741	9561	G.B.	*Quality Assurance Through Sampling Inspection.* (Engineer, Vol. 175, No. 4,555, 30/4/43, pp. 346-347.)
742	9736	G.B.	*Quality Control in Production Engineering (contd.).* (H. Rissik, Airc. Eng., Vol. 15, No. 169, March, 1943, pp. 85-90.)
			Scrap, Foundries.
743	9090	G.B.	*South African Steel Works Progress.* (Engineer, Vol. 175, No. 4,553, 16/4/43, p. 315.)
744	9094	S. America ...	*Scrap Metal from South America.* (Engineering, Vol. 155, No. 4,030, 9/4/43, pp. 285-286.)
745	9361	U.S.A. ...	*Buik's Cylinder Head Foundry.* (Aero Digest, Vol. 42, No. 2, pp. 192-199, Feb., 1943.)
746	9624	U.S.A. ...	*Scrap Segregation.* (Airc. Prod., Vol. 5, No. 55, May, 1943, p. 251.)
747	9735	G.B.	*Ministry of Supply Scheme for Segregation of Alloy Steel Scrap.* (Airc. Eng., Vol. 15, No. 169, March, 1943, p. 84.)
748	9769	G.B.	*Visit to A. Herbert, Ltd., Mechanised Foundry. (The Problems of Foundries in Wartime.)* (W. G. Morgan, J. Inst. Prod. Engs., Vol. 22, No. 2, Feb., 1943, pp. 60-67.)
			Women in Industry.
749	9145	Germany ...	*Female Labour in Germany.* (Flight, Vol. 43, No. 1,790, 15/4/43, p. 397.)
750	9211	G.B.	*Dexterity Tests for Women Workers.* (Machinist, Vol. 86, No. 46, 27/2/43, pp. 1,280-1,281.)
751	9324	G.B.	*The Employment and Payment of Women Engineering Workers.* (J. McHale, Mech. World, Vol. 113, No. 2,935, 2/4/43, pp. 347-349.)
752	9660	G.B.	*Women in War Production Jobs.* (Prod. and Eng. Bull., Vol. 2, No. 5, March, 1943, pp. 225-229.)
753	9665	U.S.A. ...	*Women in the Machine Tool Industry.* (W. E. Whipp, Machinist, Vol. 86, No. 44, 13/2/43, pp. 1,213-1,215.)
			General Welfare of Workers.
754	9519	G.B.	*Protecting the Skin of Industrial Workers.* (Machinery, Vol. 62, No. 1,591, 8/4/43, p. 383.)
755	9598	G.B.	*Air Conditioning.* (F. H. Slade, Airc. Prod., Vol. 5, No. 55, May, 1943, pp. 236-240.)
756	9659	G.B.	*Heating and Ventilating War Factories.* (Prod. and Eng. Bull., Vol. 2, No. 5, March, 1943, pp. 217-224.)
			Transport.
			Tanks, Trucks, and Rail Transport.
757	8973	U.S.A. ...	*"Flexitanks" for Hauling Petroleum.* (Nat. Pet. News, Vol. 35, No. 6, 10/2/43, p. 4.)
758	9091	G.B.	*Modern Locomotive Superheating (Part II).* (B. Reed, Engineer, Vol. 175, No. 4,553, 16/4/43, pp. 304-305.)
759	9162	Germany ...	*German Truck with Special Crane for Maintenance Work (Photo).* (Flight, Vol. 43, No. 1,789, 8/4/43, p. 368.)

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760	9310	U.S.A.	...	*Tubeless Tyres.* (Nat. Pet. News, Vol. 35, No. 4, 22/1/43, p. 9.)
761	9438	U.S.A.	...	*Maintenance of Battery-Powered Plant Trucks.* (F. L. Sahlmann, Aviation, Vol. 42, No. 1, pp. 155-158, 323, Jan., 1943.)
762	9646	U.S.A.	...	*Army's New Light Tank M5 (Photograph).* (Army Ordnance, Vol. 24, No. 137, March-April, 1943, p. 308.)
763	9651	U.S.A.	...	*American Tanks in Battle.* (G. L. Scott, Army Ordnance, Vol. 24, No. 136, Jan.-Feb., 1943, pp. 67-71.)
764	9778	U.S.S.R.	...	*Soviet Sound Truck on Eastern Front.* (Autom. Ind., Vol. 87, No. 5, 1/9/42, p. 47.)
765	9951	G.B. ...	...	*Modern Locomotive Superheating (Part I).* (B. Reed, Engineer, Vol. 175, No. 4,552, 9/4/43, pp. 283-287.)
				Ship Propulsion.
766	9184	G.B. ...	...	*Marine Gas Engines and Producers.* (Trade and Engineering Times, Vol. 52, No. 949, March, 1943, p. 30.)
767	9326	G.B. ...	...	*Marine Engine Torque and Propeller Performance.* (Mech. World, Vol. 113, No. 2,932, 12/3/43, p. 272.)
768	9451	G.B. ...	...	*The Fouling of Ships.* (G. D. Bengough and V. G. Shepheard, Engineer, Vol. 175, No. 4,554, 23/4/43, pp. 327-329.)
769	9452	G.B. ...	...	*British Prefabricated Tugs.* (Engineer, Vol. 175, No. 4,554, 23/4/43, pp. 336-338.)
770	9492	U.S.A.	...	*Substitute Electrical Materials for Naval Service.* (G. Huey, J. Am. Soc. Nav. Engs., Vol. 55, No. 1, Feb., 1943, pp. 25-43.)
771	9494	U.S.A.	...	*The Hull and its Screw Propeller. Pt. V, Cavitation.* (E. A. Stevens, J. Am. Soc. Nav. Engs., Vol. 55, No. 1, Feb., 1943, pp. 72-101.)
772	9497	U.S.A.	...	*Marine Gears and Their Maintenance (from Nautical Gazette, Sept., 1942).* (C. R. Waller, J. Am. Soc. Nav. Engs., Vol. 55, No. 1, Feb., 1943, pp. 125-131.)
773	9576	G.B. ...	...	*The Corrosion and Fouling of Ships.* (G. D. Bengough and V. G. Shepheard, Engineering, Vol. 155, No. 4,033, 30/4/43, pp. 358-360.)
				Wireless and Electricity.
				Wireless and Radio Shielding.
774	9066	U.S.A.	...	*Storage Battery Performance at Low Temperatures (Digest).* (J. H. Little and R. A. Daily, J.S.A.E., Vol. 51, No. 2, Feb., 1943, pp. 74-75.)
775	9238	U.S.A.	...	*Radio and Fleet Aviation.* (F. Akers, Flying and Pop. Av., Vol. 32, No. 2, Feb., 1943, pp. 165-166.)
776	9285	G.B. ...	...	*Receiver Input Circuits (Abstracts and References).* (R. E. Burgess, Wireless Engineer, Vol. 20, No. 233, Feb., 1943, pp. 66-76.)

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777	9703	U.S.A. ...	*Aircraft Engine Radio Shielding.* (R. W. Randolph, S.A.E., Nat. Aeronautics Meeting, March, 1942.)
778	9968	G.B.	*Wireless Engineer (Abstracts and References).* (Compiled by the Radio Research Board, May, 1943.)
			Electricity.
779	9007	G.B.	*Measurement of Shock Electric Wave Lengths.* (Nature, Vol. 151, No. 3,828, 13/3/43, pp. 313-314.)
780	9130	U.S.A. ...	*Fibre Conduit for the Installation of Electrical Cables (Bermica).* (Ind. and Eng. Chem., Vol. 21, No. 4, 25/2/43, p. 277.)
781	9271	G.B.	*Voltage Fluctuations in Resisters.* (N. R. Campbell and V. G. Francis, Phil. Mag., Vol. 34, No. 231, April, 1943, pp. 259-265.)
782	9284	G.B.	*Abstracts and References, Electrical Standards and Standardisation.* (W. H. F. Griffiths, Wireless Engineer, Vol. 20, No. 234, March, 1943, pp. 109-126.)
783	9302	G.B.	*Static Electrical Charges.* (Engineering, Vol. 155, No. 4,032, 23/4/43, p. 352.)
784	9495	U.S.A. ...	*The Basic Concepts of Current Flow Along Conductors and in Tubes, Circuits, Radiation, etc., for Electromagnetic Waves at High Frequencies. (From General Electric Review, Oct., 1942.)* (S. Ramo, J. Am. Soc. Nav. Engs., Vol. 55, No. 1, Feb., 1943, pp. 103-104.)
785	9499	U.S.A. ...	*Transmission of Power in Compressed Gas Dielectric Cables (for Insulating Purposes). (J. Frank. Inst., Sept.-Oct., 1942.)* (H. M. Hobart, J. Am. Soc. Nav. Engs., Vol. 55, No. 1, Feb., 1943, pp. 144-169.)
786	9502	U.S.A. ...	*Eliminating Bouncing and Chattering in Electrical Relays (Hollow Relay Contacts Partly Filled with Powder). (From Metals and Alloys, Sept., 1942.)* (J. Am. Soc. Nav. Engs., Vol. 55, No. 1, Feb., 1943, pp. 181-182.)
787	9662	G.B.	*Voltage Surges Caused by Contactor Coils.* (J. R. Taylor and C. E. Randall, J. Inst. Elect. Engs., Vol. 90, Pt. 1, No. 26, Feb., 1943, pp. 94-95.)
788	9663	G.B.	*Fluctuations in Space-Charge—Limited Currents.* (D. A. Bell, J. Inst. Elect. Engs., Vol. 90, Pt. 1, No. 26, Feb., 1943, p. 95.)
			Heat Transfer and Velocity of Sound Determination.
789	9038	U.S.A. ...	*Heat Transfer and Fluid Resistance in Ljungstrom Regenerative Type of Air Preheaters.* (H. Karlson and S. Holm, Trans. A.S.M.E., Vol. 65, No. 1, Jan., 1943, pp. 61-72.)
790	9270	G.B.	*The Determination of Velocity of Sound by the Employment of Closed Resonators and the Hot Wire Microphone.* (W. S. Tucker, Phil. Mag., Vol. 34, No. 231, April, 1943, pp. 217-235.)

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791	9294	G.B.	*Modern Developments in Heating.* (F. Buckingham, Engineering, Vol. 155, No. 4,031, 16/4/43, p. 305.)
792	9296	G.B.	*Pioneers of Refrigeration.* (Engineering, Vol. 155, No. 4,031, 16/4/43, p. 314.)
793	9300	G.B.	*Modern Developments in Heating.* (F. Buckingham, Engineering, Vol. 155, No. 4,032, 23/4/43, pp. 324-325.)
794	9339	G.B.	*Principles of Pressure Water Cooling.* (J. E. Ellor, J.S.A.E., Vol. 51, No. 3, March, 1943, pp. 65-68 and 77.)
795	9564	G.B.	*Infra-Red Lamp Heating Industry.* (Engineer, Vol. 175, No. 4,555, 30/4/43, p. 355.)
796	9570	G.B.	*Modern Developments in Heating (contd.).* (F. Buckingham, Engineering, Vol. 155, No. 4,033, 30/4/43, pp. 344-345.)
			Photography.
797	9234	U.S.A. ...	*Photography in U.S. Naval Air Arm.* (L. A. Pope, Flying and Pop. Av., Vol. 32, No. 2, Feb., 1943, pp. 132-134 and 275.)
798	9480	Germany ...	*New German High Speed Camera.* (Flight, Vol. 43, No. 1,792, 29/4/43, p. 445.)
799	9657	U.S.A. ...	*Simplified Spark Photography ("Sparkograph" Machine).* (Army Ordnance, Vol. 24, No. 136, Jan.-Feb., 1943, pp. 123-125.)
			Meteorology.
800	9272	G.B.	*The Separation of Electricity in Clouds.* (G. C. Simpson, Phil. Mag., Vol. 34, No. 231, April, 1943, pp. 285-287.)
801	9737	Canada ...	*Astral Aircraft Navigation.* (J. W. Melson, Canadian Aviation, Vol. 15, No. 8, Aug., 1942, pp. 47-51, 78-80 and 84.)
			Aviation Medicine.
802	8990	Germany ...	*New Results and Problems in Medical Stratosphere Research.* (*R.T.P. Trans. No.* 1,637.) (H. Strughold, J. Roy. Aeron. Soc., Vol. 47, No. 388, April, 1943, pp. 113-117.)
803	9236	U.S.A. ...	*Aviation Medicine.* (L. D. Carson, Flying and Pop. Av., Vol. 32, No. 2, Feb., 1943, pp. 160-162 and 232-234.)
804	9675	Germany ...	*New German Research Institute of Aviation Medicine.* (Flight, Vol. 43, No. 1,785, 11/3/43, p. 257.)
805	9681	G.B.	*Directorate of Air Force Welfare.* (Flight, Vol. 43, No. 1,785, 11/3/43, p. 262.)
			Mathematics and Physics.
806	9006	U.S.S.R. ...	*Theoretical Physics in the U.S.S.R. during the Last 25 Years.* (D. Ivanenko, Nature, Vol. 151, No. 3,828, 13/3/43, pp. 293-294.)
807	9096	G.B.	*Coriolis Theorem.* (C. E. Stratton, Engineering, Vol. 155, Vol. 4,030, 9/4/43, p. 294.)

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808	9403	U.S.A. ...	*The Audible and the Ether Spectrum.* (Metal Progress, Vol. 42, No. 4, Oct., 1942, p. 714.)
809	9435	U.S.A. ...	*How to Fair Lines by Graphical Calculus (Mathematical Lofting).* (D. Madsen, Aviation, Vol. 42, No. 1, pp. 136-140, 349-350, Jan., 1943.)

August, 1943

Abstracts from the Scientific and Technical Press

(No. 113. June, 1943)

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ABSTRACTS FROM THE SCIENTIFIC AND TECHNICAL PRESS.

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Notices and abstracts from the Scientific and Technical Press are prepared primarily for the information of Scientific and Technical Staffs. Particular attention is paid to the work carried out in foreign countries, on the assumption that the more accessible British work (for example that published by the Aeronautical Research Committee) is already known to these Staffs.

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NOTE.—As far as possible, the country of origin quoted in the items refers to the original source.

The Effect of Compressibility on Thin Slightly Cambered Profiles at Subsonic Speed. (W. Hantzsche and H. Wendt, Z.A.M.M., Vol. 22, No. 2, April, 1942, pp. 72-86.) (113/1 Germany.)

The calculation of a steady two-dimensional potential gas flow in the subsonic region can be carried out by a method of successive approximations as shown by Pauzen (1913) and Rayleigh (1916). This corresponds to a development of the potential or stream function in terms of the Mach number, the first approximation being thus that of incompressible flow.

The second and third approximations are applicable to arbitrary profiles and angles of incidence provided the Mach number is small. It would be difficult to calculate the flow for higher Mach numbers by this method, since a large number of steps would be required and the labour involved become excessive.

Prandtl (1927) and Glanert (1928) have given an approximation for all subcritical velocities, provided the additional velocities are small compared with the stream velocity (thin profiles at a small incidence). In this case the differential equation for the potential and stream functions assumes the incompressible form of the affine transformation of an independent variable. Following a suggestion by Busemann, the authors have developed a method of successive approximations for the stream function, the first step corresponding to the Prandtl-Glanert approximation. For this purpose, the stream function is developed in terms of a parameter characterising the deviation of the given profile as regards thickness, curvature coincidence from a line profile at zero incidence. The first term of the series represents the undisturbed parallel flow. With the addition of the

second term we obtain the Prandtl approximation, whilst the third term allows for finite thickness of profile. The method is applied by the authors to the calculation of the maximum additional velocity for an ellipse (symmetrical flow) and the lift of a Joukousky aerofoil.

The results show that the compressibility effects, taking into account thickness, curvature and incidence of the profile, increase at a slightly greater rate than is given by the Prandtl estimate.

Measurement of the Aerodynamic Forces on Small Wing Models Undergoing Vibration (Combined Flapping and Twist). (E. V. Holst, L.F.F., Vol. 20, No. 5, 16/6/43, pp. 137-146.) (113/2 Germany.)

The article is of interest as giving for the first time accurate measurements on vibrating wings at low Reynolds numbers ($Re \sim 1{,}000$).

The experiments were carried out on a model insect wing, made of balsa wood and ground very thin. The surface is of elliptic plan, slightly cambered, 32 mm. long with a maximum chord of 8 mm. and weighs 19 milligram.

The axis about which the vibration takes place is parallel to the longitudinal axis of the wing, but displaced towards the leading edge and passes approximately through the $\frac{1}{3}$ chord position at the maximum width.

The wing is supported on a framework made of 0.2 mm. steel wire, flapping and twisting motion being effected by means of a double crank. The whole system is mounted on a single torsion wire by means of which the thrust (drag) and lift can be determined in succession by a null method.

A most ingenious method for recording the torque is adopted. The driving shaft operating the crank system is split, the coupling consisting of a brass cylinder suspended in an oil bath. The relative velocity between the oil container and the central cylinder is a measure of the viscous torque transmitted and can be obtained by direct calibration.

The average thrust and lift forces of the vibrating wing are of the order of 20 milligram and consistent measurements to within a fraction of a milligram can be obtained on the torsion balance, provided the pertinent factors are kept constant (of these the most important are the frequency of the vibration and the velocity of the incident airstream).

The torque measurements, on the other hand, although reasonably consistent, suffer from the fact that they include the friction in the driving links. The load on the links is partly due to inertia and partly aerodynamic. The friction due to inertia loads can be determined easily by a separate experiment and a suitable allowance made.

The friction due to aerodynamic loads is difficult to determine exactly and no correction has been applied. The author estimates that the recorded torques are throughout about 25 per cent. too high for this reason.

All the experiments were carried out at a constant flapping angle of 68° (total angular deflection between extreme positions).

The twist amplitude of the wing about the flapping axis could be varied between 0 and 150°, the corresponding crank being sloped for this purpose.

Both twist and flap are of the same period but displaced 90° in phase, the tests covering frequencies of 10, 15, 20 and 25 vibrations/sec. respectively.

Measurements were taken both under static conditions and in the presence of an incident wind.

($v = 50$ and 100 cm./sec. respectively.)

In the latter case, the axis of the vibrating wing projected through a hole in the walls of a miniature wind tunnel (6 cm. diameter), the whole of the supporting framework and recording gear being outside the tunnel.

In the case of orthodox aircraft, the thrust and lift producing organs are sharply differentiated (propeller and fixed wings). With a vibrating wing, however, both thrust and lift can be produced by the same mechanism, the inclination

of the resultant air force being controllable over wide limits, even if the amplitudes of flap and twist remain constant.

As already stated, in the model tested by the author, the twist of the blade is 90° out of phase with the flapping. The mean or zero position of the wing with regard to the flapping plane is however arbitrary and this angle τ is one of the factors influencing the resultant force.

Two other factors are the angle ψ between the flapping plane and the incident flow and the angle α which the profile makes with the incident flow.

The author investigated the following combinations:—

(1) $\psi=90°$, $\alpha=0°$, $\tau=90°$.
(2) $\psi=70°$, $\alpha=20°$, $\tau=90°$.
(3) $\psi=45°$, $\alpha=45°$, $\tau=90°$.
(4) $\psi=90°$, $\alpha=20°$, $\tau=70°$.
(5) $\psi=90°$, $\alpha=45°$, $\tau=45°$.
(6) $\psi=70°$, $\alpha=0°$, $\tau=20°$.

Each of these settings was tested for various amplitudes of twist (0 to 140°), vibration frequencies (10 to 25 sec.) and wind speeds (0 to 100 cm./sec.), the flapping angle being constant throughout (68°).

The results are expressed in terms of non-dimensional parameters, defined as follows:—

$$\text{Thrust coefficient } k_s=\frac{S}{\frac{1}{2}\rho u^2 F}$$

$$\text{Lift coefficient } k_a=\frac{A}{\frac{1}{2}\rho u^2 F}$$

$$\text{Torque coefficient } k_l=\frac{M}{\frac{1}{2}\rho u^2 F}$$

$$\text{Thrust efficiency } \eta_s=(k_s/k_l)\,\lambda$$

$$\text{Static thrust performance } \xi=k_s/(2k_l)^{2/3}$$

where

S = thrust.
A = lift.
M = torque.
u = mean tip speed of wing due to flapping.
v = incident air speed.
λ = speed ratio v/u.
F = area swept during one complete flapping.

Discussion of Results.

(1) $\psi=90°$, $\alpha=0°$, $\tau=90°$.

This symmetrical vibration produces thrust only, the motion resembling that of a propeller.

Plotted on a X basis (amplitude of twist) with frequency n as parameter, the k_s curves are roughly parabolic, a maximum value of .08 being reached at $X=90°$.

Under static conditions (absence of incident wind) the frequency has very little effect. In the presence of an incident wind, the k_s curves separate in the order of their frequency, the separation being the more marked, the higher v.

Plotted on a λ basis, k_s diminishes almost linearly with λ, the steepness of the curves increasing as the parameter X increases.

Optimum thrust efficiency ($\eta_s=.45$, not allowing for friction) occurs at $\lambda=.5$ and $X=90°$.

Under static conditions, η_s max. is about .4 at $X=120°$.

[In the case of insect flight, considerably higher thrust efficiencies are no doubt possible, the wing in this case being flexible and set at the optimum incidence during each phase of the motion.]

(2) $\psi=70°$, $\alpha=20°$, $\tau=90°$.

The plane of flapping now makes an angle of 20° with the incident air stream. Both thrust and lift are produced, the relative proportions of each depending on X and λ. It is thus possible to direct the resultant air force in almost any required direction.

For any given value of λ, the resultant force becomes a maximum for a given value of X which decreases as λ increases :—

λ	0	.4	.8	1.0
X	100°	70°	50°	40°
k_a	.025	.06	.11	.15
k_s	.07	.05	.01	−.01

Whilst, just as in Case 1, k_s diminishes with increasing λ, the slope being roughly proportional to X, the reverse holds for k_a.

Thus, a large amplitude of twist is beneficial for producing thrust but the lift coefficient becomes highest at small amplitudes.

The power absorbed by the vibration is practically identical with that of the previous case, *i.e.*, the high lift forces do not require extra work. The thrust efficiency curves are not markedly affected, apart from being compressed into a smaller λ range. The optimum thrust efficiency is unaltered.

(3) $\psi=45°$, $\alpha=45°$, $\tau=90°$.

The lift coefficient increases still further whilst the thrust is reduced. The maximum resultant force (split up into thrust and lift components) is given in the following table :—

λ	0	.4	.6
X	100°	90°	70°
k_a	.065	.115	.150
k_s	.065	.02	−.025

The thrust efficiencies are considerably reduced (optimum value=.28, uncorrected for friction) and the range over which a positive thrust can be produced is shortened still further ($\lambda=0$ to .5).

(4) $\psi=90°$, $\alpha=20°$, $\tau=70°$.

In this case the incident air stream is perpendicular to the flapping plane, lift and thrust being produced by a change in the zero position of the wing, the mean position now making an angle of 70° with the flapping plane.

The incidence α is thus the same as in Case (2) considered above. The thrust coefficients are, however, appreciably less, whilst the lift coefficients somewhat higher.

The optimum thrust efficiency is reduced to .2 at $\lambda=.30$.

The maximum resultant force components are given below :—

λ	0	.4	.6	.8
X	100°	70°	70°	60°
k_a	.055	.08	.10	.12
k_s	.07	.035	.01	−.015

(5) $\psi=90°$, $\alpha=45°$, $\tau=45°$.

Practically no thrust is produced, whilst the lift is no greater than in Case (4).

The reason for this marked difference in behaviour is investigated by the author. It appears that in Cases (1)-(3), the resultant forces are mainly due to the circulation round the profile, whilst in (4) and (5) the drag of the aerofoil plays an important part (broadside motion during part of stroke). This explains the much greater efficiency of the former type of vibration.

(6) $\psi=70°$, $\alpha=0°$, $\tau=20°$.

This type of vibration is of special interest since an appreciable lift is produced, although the mean blade incidence is zero. At the same time the thrust coefficient differs only little from Case (1).

The inclination of the flapping plane, whilst retaining zero mean incidence causes a difference in the effective angle of incidence in the up and down strokes, resulting in a lift component which is negative unless $X<30°$.

There are thus three possible ways of producing a lifting force with a vibrating wing system:—

(*a*) Tilting of flapping plane, wing twist symmetrical with regard to plane ((2) and (3) above).

(*b*) Flapping plane normal to incident wind, wing twist unsymmetrical ((4) and (5) above).

(*c*) Flapping plane inclined, any twist symmetrical with regard to incident wind ((6) above).

A large scale mechanical imitation of the flapping flight of birds or insects is not feasible. On account of the close connection with helicopter problems, however, the vibrating wing is of great theoretical interest. This aspect of the problem will be dealt with by the author in a subsequent paper.

Device for the Automatic Limitation of the Aircraft Acceleration in a Vertical Direction. (Potez Patent No. 733,589, Patent Series No. 4, p. 26; Flugsport, Vol. 35, No. 9, 19/5/43.) (113/3 France.)

PRINCIPAL CLAIMS.

Device for the automatic limitation of the vertical acceleration of aircraft consisting of a split control rod system consisting of two parts capable of undergoing mutual displacement along the same axis and held together by a tension spring, characterised by the fact that the ends of the control rods facing each other are fitted with pivoted cross bars, which serve as attachment for the tension spring and floating link respectively, which are thus placed on opposite sides of the control rod centre line.

At the floating link end, the cross bars are provided with right angled extension pieces to which inertia masses are attached.

A vertical acceleration of the aircraft thus causes an extension or contraction of the spring coupling and the corresponding change in the length of the control rod systems causes a corresponding change in the elevator deflection. The inertia device only becomes effective if the aircraft is undergoing vertical acceleration and reduces the possible elevator deflection corresponding to a given control stick deflection. If the aircraft is flying steadily, full deflection is restored.

Device for the Dynamic Stabilisation of Aircraft. (Junkers Patent No. 733,588, Patent Series No. 4, pp. 25-26; Flugsport, Vol. 35, No. 9, 19/5/43.) (113/4 Germany.)

The basic feature of the patent consists in the introduction of a phase lag between the operation of the elevator and the displacement of the aircraft with the object of damping out longitudinal oscillations rapidly. If T=periodic time of such oscillations, the optimum phase lag is about $T/4$, *e.g.*, maximum elevator deflection in a downward direction occurs $T/4$ seconds after the maximum vertical acceleration of the aircraft or at the instant of zero acceleration.

This is achieved by coupling the elevator control rod to an elastically suspended mass capable of executing vibrations in a vertical direction, these vibrations being transmitted by means of a ratchet to a flywheel the axis of rotation of which is at right angles to the longitudinal axis of the aircraft.

Instead of having separate oscillating and rotating masses, the desired effect can also be produced by utilising parts of the existing control rod and elevator systems.

(Since only a digest of the patent is given, the constructional details are not clear. It is of interest to note that a somewhat similar device appears to be fitted to the Soviet Lagg 3 Fighter (see R.T.P. Translation No. 1822).)

Vision, Hearing and Aeronautical Design. (L. D. Carson, W. R. Miles and S. S. Stevens, J. Aeron. Sc., Vol. 10, No. 4, April, 1943, pp. 127-130.) (113/5 U.S.A.)

VISION.

It is desirable that pilots, observers and engineers should be placed as near as possible to the aircraft windows. This not only increases the angle of vision, but it is also generally easier to provide the requisite transparent area free from opaque accessories. At the same time, blemishes or scratches in the window, being out of focus, are less bothersome. For this reason turrets in which the guns are mounted at the side and rather low down are preferable to the orthodox type in which the gunner is placed behind the gun. In the latter case, it is difficult to reduce the distance between eye and window (aiming panel) below 29 inches (9 inches from eye to gunsight and 20 inches between sight and aiming panel). The field of vision in this case is only about 28° (tunnel vision) and may possibly be obstructed moreover by the gun structure and window frames. With lateral guns a much closer position to the front panel should generally be possible for the gunner.

Special attention should be paid to the instrument lighting, especially at night. Excessive illumination has serious effects on the eye adaptation for night vision. For this reason the illuminated area should be restricted to the utmost and only red light used (600 $\mu\mu$). It is well known that the tendency to air sickness is reduced, if visual contact with the ground can be maintained.

Many troop carrying gliders suffer from this defect with the result that the fighting efficiency of the men after landing may be seriously affected.

HEARING.

Both propeller slipstream and engine noise depend on the horse-power, and with the larger power plants now coming into general use, the noise problem becomes serious.

Even if the engine and propeller could be silenced, the noise associated with the turbulent air stream passing over the fuselage is very considerable. Thus it is almost impossible to hold a conversation inside a glider towed at 150 m.p.h., the noise level being of the order of 115 decibel.

The most important practical effect of aircraft noise is the masking of communications. Articulation tests have shown that with standard military interphone equipment a listener is only able to understand about 50 per cent. of the spoken words in the presence of a background noise of 120 db. Matters can be improved by the provision of absorbent material which, although not reducing the overall noise level appreciably, does cut down the harmful high frequency components and facilitate conversation. Another remedy consists in improving the response characteristic of the microphone and earphone (high fidelity) and in shielding these instruments as far as possible from extraneous sounds.

The oxygen mask provides facilities for microphone shielding which is still often neglected. The earphone and the ear of the listener can be shielded by means of an acoustic socket forming a tight seal against the side of the head.

Both seeing and hearing, if accompanied by prolonged attentive effort, causes fatigue and loss of efficiency of the crew. Elaborate precautions are taken to ensure the proper function of the aircraft mechanism under modern arduous

condition of operation. The authors make a plea that at least equal attention be paid to the physiological requirements of the flying personnel.

True Air Speed Indicator. (R. D. Gibson, U.S.A. Patent No. 2, 318,153.) (113/6 U.S.A.)

The normal air speed indicator measures the velocity head $\frac{1}{2}\rho V^2$ and its indications therefore depend on the density ρ as well as on the relative air speed V.

If such an instrument has been calibrated under standard ground level conditions ($p=760$ mm., $T=288°$ C_A), the true air speed at pressure p and temperature T is obtained by multiplying the indicated air speed by the factor

$$\sqrt{760/p} \times \sqrt{T/288} \quad . \quad . \quad . \quad . \quad . \quad (1)$$

The invention of the author consists in applying this correction automatically by means of an electrical circuit, the true air speed being recorded on a special type of watt meter.

For this purpose the normal air speed indicator controls a rheostat ($R1$) in series with the fixed coil (3) of the watt meter and a battery. Coil (3) is of low resistance compared with the rheostat, so that the current passing through this circuit is determined mainly by the position of the variable contact on the rheostat.

It is convenient to design the rheostat and linkage mechanism such that the current C_3 through coil (3) is directly proportional to the indicated air speed. The necessary linkage mechanism is not described, but reference is made to known designs which could be utilised for the purpose (U.S.A. Patents 2,178,422 and 2,137,194 are quoted as examples).

The moving coil (4) of the watt meter is shunted with a second rheostat ($R2$) controlled by the barometric pressure (altimeter) and connected in series with a third rheostat ($R3$) similarly controlled by an air temperature meter. The whole circuit is fed by the same battery already supplying the fixed coil (4). The resistance of ($R2$) is relatively low compared with ($R3$) and (4) and varies inversely as the square root of the pressure. (U.S.A. Patent No. 2,251,498 is quoted as an example for producing the necessary linkage.)

Rheostat ($R3$) has a relatively high resistance and therefore controls the total current C_1 flowing through the circuit containing ($R2$) and (4) in parallel.

($R3$) is controlled by a temperature indicator in such a way that the total current C_1 varies directly as the square root of the absolute temperature.

We thus have

$$R_2 = K_2\sqrt{760/\rho}$$
$$C_1 = K_3\sqrt{T/288}$$

Since ($R2$) is small compared with (4), nearly all the current C_1 passes through $R2$, producing a voltage drop C_1R_2, which corresponds to the voltage applied to the moving coil.

The current C_2 passing through the moving coil is therefore given by

$$C_2 = K_4C_1R_2 = K_5\sqrt{760/\rho} \cdot \sqrt{T/288}$$

The indication of the watt meter is the product C_2C_3 and corresponds therefore to

$$K\sqrt{760/\rho} \times \sqrt{T/288} \times \text{indicated air speed.}$$

The density correction required by equation (1) above has thus been incorporated automatically in the watt meter reading, the scale of which gives true air speed.

A Method for Rapid Estimation of Helicopter Performance. (Q. Wald, J. Aeronautical Sciences, Vol. 10, No. 4, April, 1943, pp. 131-135.) (113/7 U.S.A.)

Several papers are available which treat the analysis of rotating wing aircraft with considerable rigour and completeness. While these treatments are satis-

factory for exhaustive analyses of specific helicopters, they are exceedingly complex. Since simple methods of performance estimation are available for aeroplanes, it is believed that a comparable system for helicopters should prove useful for comparative performance studies, preliminary estimation of characteristics of proposed designs, and determination of the effects of small changes in design. Frequently, only limited data are available for studies of this type, making elaborate analyses impossible or undesirable. The present report proposes a system of performance estimation which, it is hoped, will fulfil the need. The method is relatively simple and rapid.

The method is based on the conception of the rotor as an actuator disc and the well-known momentum relations for an actuator disc. All of the major variables in design and operation are taken into account. Comparisons have indicated that the results obtained by this system are good approximations to the results of more elaborate analysis.

A Tabular Method of Propeller Blade Stress Analysis. (Joseph Stuart, Journal of the Aeronautical Sciences, Vol. 10, No. 4, April, 1943, pp. 115-118.) (113/8 U.S.A.)

A tabular, trial-and-error method of evaluating the steady bending stresses in a rotating propeller blade is developed and examples of the application are given. The bending moment at a shank section of the blade is estimated and, by tabular integration, the corresponding radial bending moment distribution is calculated. Additional trials with appropriately revised shank section bending moment estimates are made until the correct distribution is found, having the physically required moment value of zero at the blade tip.

Tilted blades and blades whose section centres of gravity do not in general fall on the blade axis are shown to be readily analysed. Because the final analysis can be quickly checked on a calculating machine and because the method is easily learned, versatile and fast, its general adoption by the propeller industry is advocated.

General Equations for the Analysis of Elliptical Rings. (D. O. Dommasch, J. Aeronautical Sciences, Vol. 10, No. 4, April, 1943, pp. 119-126.) (113/9 U.S.A.)

The analysis of bulkhead rings is at best a tedious process, and it is felt that any simplifications will be of help to the aircraft structural engineer.

Of the several methods of analysis available, that outlined in N.A.C.A. Technical Report No. 509 (1934) seems to be the simplest and most widely used. This paper is based on the general method of the N.A.C.A. report and presents, in particular, the application of the report to elliptical and circular frames. In addition, some general simplifications based on symmetry and load conditions are presented.

No attempt has been made to break down the analysis into a number of specific solutions, but rather simplifications of the basic equations are presented which apply to any loading condition.

A set of curves is presented at the end of this article from which the length, moment of length, and moment of inertia of the length of an ellipse may be determined.

General Instability of Monocoque Cylinders. (N. S. Hoff, J. Aeron. Science, Vol. 10, No. 4, April, 1943, pp. 105-114, 130.) (113/10 U.S.A.)

General instability is defined as the simultaneous buckling of the longitudinal and transverse reinforcing elements of a monocoque structure. There are several types of instability satisfying this definition which differ markedly in the distortion pattern and value of the critical load.

Types already described in literature include :—

1. *Flattening in Compression.*—In this case the original circular rings distort to ellipses and the originally straight stringers to sine curves of one or more half wave lengths.

2. *Diamond Pattern in Compression.*—The deflections are sinusoidal in both the longitudinal and circumferential directions and usually consist of several half waves in either direction.

(Type 1 is a special case of the diamond pattern when there are four half waves in the circumferential direction.)

3. *Flattening in Bending.*—The structure undergoes considerable elastic deformation under a pure bending moment and collapses suddenly when the flattening exceeds a certain value.

4. *Inward Bulge in Bending.*—The bulge develops symmetrically to the most highly stressed fibres in compression, the tension side of the structure remaining smooth.

Of the above types No. 1 and 3 are of like practical interest to the aircraft designer since they entail a stringer-ring-skin combination not likely to occur in practice.

The buckling load of the diamond pattern (type 2) of general instability has been calculated by a number of authors, the actual monocoque being replaced by an equivalent orthotropic shell possessing suitable bending rigidity distributed in the longitudinal and circumferential directions. Agreement with practice is reasonably good, provided experimental values for the stiffness are included.

Many attempts have been made to apply such buckling formulæ to the calculation of the critical stress under bending, it being assumed that this stress must be substantially the same as that in compression if the wave formation occurs only in close proximity of the most highly stressed compression fibre.

Agreement with practice is, however, very poor, the experimental critical stress being always considerably lower and reaching in some cases only 1/10 of the predicted value.

The author suggests that this is mainly due to the diamond type of distortion (on which the theory is based) not being retained when bending takes place. For this reason, a type of distortion known to occur in certain cases of bending (inward bulge, type 4) is investigated theoretically, the buckling load being calculated by the Rayleigh-Ritz-Timoshenko method, the strain energy stored in the sheet being first neglected. Although in some cases the experimental buckling load was in fair agreement with the theoretical prediction, in others the calculated values were less than 1/9 of the practical critical load.

In the present paper, the author revises his original theory to allow for the effect of the covering sheet. A simple formula is derived, which, although it is based on a series of assumptions gives reasonable agreement with practice provided experimental values for the wave form of the buckle (inward bulge) are available.

Instructions for carrying out the necessary calculations are given in detail.

Mobile Unit for the Periodic Cleansing of the Lubricating System of Machine Tools. (Flugsport, Vol. 35, No. 9, 19/5/43, pp. 111-112.) (113/11 Germany.)

Modern machine tools are provided with two lubricating systems, one of which supplies lubricating oil to the gears and bearings whilst the other handles the cooling oil supplied to the tool.

In the past such machines were lubricated by the operator in a rather haphazard manner and insufficient attention was paid to the removal of oil sludge. This sludge contains minute particles of metal which in course of time cause serious troubles in the bearings and gears.

It is now recognised that the proper maintenance of such tools should be in the hands of a special staff and in order to facilitate this, the Junkers firm have designed a special mobile unit containing all the necessary tools as well as supplies of fresh oils. Of special interest is an electrically heated tank of cleansing fluid which can be pumped through the oil tanks and supply pipes of the machine tool to ensure the complete removal of sludge and dirt prior to refilling with new oil.

Needless to say, the old oil is also drawn off by a pump carried on the unit and the supplies collected in this manner are subsequently regenerated. By having all the pump circuits integral with the unit, the cleansing operation can be carried out very quickly and the truck dimensions are such that mobility in the shop is ensured.

Plexiglass—Properties and Fabrication. (Reference Sheet No. 7-8, Flugsport, Vol. 35, No. 9, 19/5/43, pp. 112a-b.) (113/12 Germany.)

Plexiglass is a thermoplastic of the acryl resin class and is available in plate form in a series of standard sizes ranging in thickness from 1 mm. to 8 mm. and in superficial area from 600 × 400 mm. to 1,600 × 1,100 mm.

The following table gives some of the physical constants:—

Density	1.19	
E	30,000	
Ultimate tensile +40°C.	> 450	kg./cm.²
+20°C.	> 600	,,
−40°C.	> 850	,,
−70°C.	> 1,000	,,
Extension	> 2.5″	
Creep strength	300	kg./cm.²
Crushing strength	1,200	,,
Bending strength	1,000	,,
Impact strength		
Plane +20°C.	> 15	cm. kg./cm²
Notched +20°C.	> 1.5	,,
Plane −60°C.	> 15	,,
Notched −60°C.	> 1.5	,,
Coefficient of thermal expansion	82×10^{-6}	

Both creep and notch sensitivity must be considered when designing stressed parts. Attention must also be given to the possibility of stress-corrosion in the presence of organic solvents such as petrol and turpentine.

Single directions for cutting, milling, turning, boring and polishing the material are given. All the ordinary machine tools are suitable for these processes, especially those employed in wood working. Care must be taken to prevent overheating the materials and the worked surface must be cooled with water, compressed air or a non-lubricating cutting fluid.

Since no amount of subsequent polishing can replace the surface produced by the makers, it is essential that a suitable cover of paper or paste be provided for those parts not in contact with the tool.

Plexiglass can be easily moulded, either by laying the sheet (previously softened by warming to 120-150°C.) over a former and pulling down the edges or by blowing. The latter process gives the better optical surface.

The very high coefficient of thermal expansion of plexiglass (over three times that of aluminium) calls for special care in the installation. It is essential that stresses be avoided as they may lead to corrosion cracks which are detrimental to clear vision. On account of the high notch sensitivity, care must be taken to avoid all sharp corners. The usual procedure is to recess the glass slightly along the edge and grip it between two metal plates (above and below) fitted

with rubber pads which are tightened by means of a screw passing through a well rounded slot in the glass. Sufficient space must be left between the edge of the recess and the metal plates to allow for expansion.

The Ju. 87 Equipped for Medical Flight Research. (H. V. Diningshofen, Flugsport, Vol. 35, No. 9, 19/5/43, pp. 108-111.) (113/13 Germany.)

The experiments were concerned mainly with the effects of acceleration on the human organism and covered more than 200 flights, the author, who is a well known doctor, acting as pilot throughout.

By flying tight spirals during a dive it is easy to obtain centrifugal acceleration of the order of 8 g. for periods up to 5 seconds. Under these conditions the airspeed of the Ju. 87 does not exceed 200 m.p.h. and the control forces are relatively low. There is also a complete absence of vibration and the author is enthusiastic about the ease of handling of the particular aircraft, making it admirably suited for the investigation in hand.

For the experiments, the Ju. 87 carried two passengers, test subject and observer. The former is normally seated in an upright position, facing the direction of flight. The observer faces him, with his back to the direction of flight. A Siemens hot cathode X-ray apparatus (fed from an accumulator battery through a special transformer) is placed immediately behind the test subject, who carries a fluorescent screen strapped to his chest. In this manner the observer can examine the variation in blood content of the heart and lungs of the test subject during various manœuvres. The X-ray set is sufficiently powerful to enable photographic reproduction at the relatively short exposure time of 1.5 seconds.

The facial expression of the test subject is recorded independently on a cine film.

About 200 test flights covering 22 different subjects were carried out, the highest acceleration being 8.5 g. for 3 seconds.

It is interesting to note that by adopting a crouching attitude, both pilot and observer withstood this acceleration without disturbance of vision.

In the upright position and completely relaxed, all the test subjects could withstand 4 g. for a period of 5 seconds without any ill effects.

The following table gives the acceleration limits on a percentage basis :—

% of Subjects.	Misty Sight.	Blackout.	Collapse.
80	5 g.	5.5 g.	6 g.
50	6 g.	6.75 g.	7.5 g.
20	6.5 g.	7.5 g.	8.0 g.

Provided the acceleration has not lasted longer than 5 seconds, the subject recovers consciousness within 2-3 seconds after acceleration has been reduced below 3 g.

The disturbance level can be raised about 2 g. if the subjects adopts a crouching attitude with full muscular contraction. About two-thirds of the subjects tested were capable to withstand acceleration of the order of 8-9 g. by this means, without any disturbance of vision for periods up to 5 seconds.

Much higher limits are made possible if a prone position is adopted. Centrifugal tests have shown that under these conditions up to 15 g. can be withstood for 2 minutes, although breathing became very difficult.

The X-ray photographs show that the so-called acceleration collapse in its most severe and dangerous form is due to a complete failure of the blood circulation. Under the action of the centrifugal force, the blood is drained away from the heart and accumulates in the lower blood vessels, especially the legs. When this accumulation exceeds a certain amount the heart delivery ceases and the lungs are no longer fed with blood. For the relatively short exposure times and limited g. values occurring in aerial combat, however, this complete failure

of the heart pumping only occurs rarely. In the majority of cases, the main blood circulation is maintained. The rate of blood supply to the eyes and brain is however insufficient to maintain proper functioning. Under these conditions, collapse occurs although the X-rays show that both heart and lungs are still filled with blood. By adopting a crouching attitude, the work required to raise the blood to the brain is reduced and a minimum supply can be maintained for a short period.

Considering that already at 7 g., the blood has a density corresponding to that of liquid iron, the difficulties of maintaining even a minimum blood circulation for any length of time can be realised.

It is interesting to note that with lack of oxygen (imminent altitude sickness) the resistance to acceleration drops rapidly and collapse may occur in 2-3 seconds at 3 g.

LIST OF SELECTED TRANSLATIONS.

No. 56.

NOTE.—Applications for the loan of copies of translations mentioned below should be addressed to the Secretary (R.T.P.3), Ministry of Aircraft Production, and not to the Royal Aeronautical Society. Copies will be loaned as far as availability of stocks permits. Suggestions concerning new translations will be considered in relation to general interest and facilities available.

Lists of selected translations have appeared in this publication since September, 1938.

AERO AND HYDRODYNAMICS.

TRANSLATION NUMBER AND AUTHOR.	TITLE AND REFERENCE.
1734 Wieselsberger, O....	*The Influence of Wind Tunnel Boundaries on Resistance Especially in a Compressible Flow.* (L.F.F., Vol. 19, No. 4, 6/5/42, pp. 124-128.)
1738 Betz, A.	*The Velocity Profile in the Neighbourhood of a Wall of Discontinuous Curvature.* (L.F.F., Vol. 19, No. 4, 6/5/42, pp. 129-131.)

ENGINES AND ACCESSORIES.

1700 Knornschild, S. ...	*The Polytropic Efficiency of a Compressor.* (L.F.F., Vol. 19, No. 6, 20/6/42, pp. 183-188.) (Translated by Rolls Royce, Ltd.)
1747 Smirra, J.	*Cylinder Arrangements for Aircraft Power Plants.* (Luftwissen, Vol. 9, No. 7, July, 1942, pp. 210-225, and No. 8, Aug., 1942, pp. 234-237.)
1758 ——	*A New Swedish Two-Stroke Engine.* (A.T.Z., Vol. 45, No. 9, 10/5/42, pp. 251-253.)

MATERIALS.

1735 Emicko, G.... Lucas, H.	*Fundamental Investigations on the Cold and Hot Rolling of Metal into Sheet and Strip with Special Reference to Aluminium and Wrought Aluminium.* (Z.f. Metal, Vol. 34, No. 2-3, 1942, pp. 25-38 and 49-55.)
1736 Bauer, R. ... ... Eisen, J.	*The Determination of Zinc in Aluminium and Aluminium Alloys.* (Metal and Erz, Vol. 39, No. 6, 1942, pp. 100-106.)

TRANSLATION NUMBER AND AUTHOR.		TITLE AND REFERENCE.
		PRESSURE CABIN (DIGEST OF GERMAN PATENTS).
1719	——	*Pressure Cabin.* (*Henschel Aircraft Co. Patent No.* 715,460.) (Flugsport, Vol. 34, No. 4, 18/2/42, p. 93.)
1720	——	*Pressure Cabin.* (*Henschel Aircraft Co. Patent No.* 707,313.) (Flugsport, Vol. 34, No. 15, 23/7/41, p. 33.)
1721	——	*Transmissions of Electric Cables Through Pressure Cabin Walls.* (*Junkers Aircraft Patent No.* 713.266.) (Flugsport, Vol. 33, No. 24, 26/11/41, pp. 69-70.)
1722	——	*Pressure Cabin.* (*D.V.I. Patent No.* 713,118.) (Flugsport, Vol. 33, No. 24, 26/11/41, p. 69.)
1723	——	*Aircraft Fuselage with Pressure Cabin.* (*Messerschmidt Airc. Patent No.* 714,018.) (Flugsport, Vol. 34, No. 1, 7/1/42, p. 81.)
1724	——	*Operation of Aircraft Guns on High Altitude Aircraft.* (*Patent No.* 751,572.) (Rev. Ae. l'Armee de l'Air, No. 5, April, 1938, pp. 475-477.)
1725	——	*Aircraft Gun Mounted Externally to a Pressure Cabin.* (*German Patent No.* 598,251.) (Flugsport, Vol. 26, No. 13, 27/6/34, pp. 85-86.)
1726	——	*Double-Walled Pressure Cabin.* (*German Patent No.* 595,504.) (Flugsport, Vol. 26, No. 11, 30/5/34, p. 81.)
1729	——	*Double-Walled Pressure Cabin.* (*German Patent No.* 714,784.) (Flugsport, Vol. 34, No. 2, 21/1/42, p. 85.)
		MISCELLANEOUS.
1705	Stettler, O.	*Electrical Extension—Measurements on Materials.* (Flugwehr und Technik, Vol. 4, No. 8, 1942, pp. 212-214.) (Translated by Rolls Royce, Ltd.)
1708	Gebelein, H. ...	*The Statistical Problems of Correlation as a Variation and Characteristic Value Problem and its Connection with Mean Valve Calculations.* (Z.A.M.M., Vol. 21, No. 6, Dec., 1941, pp. 364-379.)
1727	——	*Turbulent Wing "Diruttore."* (Flugsport, Vol. 28, No. 13, 27/6/34.)
1742	Donatsche, H. ...	*Possible Evasive Manœuvres of Aircraft Under A.A. Fire.* (Flugswehr und Technik, Vol. 4, No. 6, June, 1942, pp. 141-144.)

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TRANSLATION NUMBER AND AUTHOR.		TITLE AND REFERENCE.
1816	Hubert, J.	*Model Experiments on Aerofoils with Various Degrees of Sweep Back, with and without End Plates.* (Jahrbuch d. deutsche Luftfahrtforschung, Vol. 1, 1937, pp. 129-139.)

TRANSLATION NUMBER AND AUTHOR.		TITLE AND REFERENCE.
1796	——	*Fluid Motion in Rotating Impellers.* (V.D.I., Forschungsheft, No. 405, 1940, pp. 1-21.)
1814	Prandtl, L.	*Sound Propagation Associated with High Velocity Source.* (Schriften Akademic Luftfahrtforschung, No. 7.)

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1797	Schmidt, R. ...	*Comparison of Various Methods for Determining Flight Speed at Great Altitudes.* (Luftwissen, Vol. 9, No. 9, Sept., 1942, pp. 270-275.)
1809	Pistolesi, E. ...	*Mutual Interference Between Airscrew and Fuselage, with some other Airscrew Problems.* (L. Aeretunica, Vol. 22, No. 6, June, 1942, pp. 255-287.)

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1790	Uggla, W. R. ...	*The Hertzian and Hydraulic Pressure on Gear Teeth.* (Teknish Tidskrift, Vol. 69, No. 3, 21/1/1939, pp. 8-11.)
1795	Haug, K.	*Comparative Investigations on the Torsional Stiffness of Automobile Engine Crankshaft.* (A.T.Z., Vol. 43, No. 16, 25/8/40, pp. 393-402.)

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1807	——	*The Behaviour of Certain Structural Materials in the Tropics.* (A.T.Z., Vol. 44, No. 12, 25/6/41, pp. 316-317.)
1811	Panseri, C. ... ... Monticelli, M. ...	*On the Correct Interpretation of Certain Phenomena Observed During Thermal Treatment of Aluminium Alloys.* (Alumino, Light Metal Research Institute, Milan, pp. 183-191.)

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1798	Schmidt, R.... ...	*Dornier Air Log.* (Jahrbuch der deutschen Luftfahrtforschung, 1938, Vol. 1, pp. 583-587.)
1800	Magnus, K. ...	*Some Notes on and Experiments with the Artificial Horizon, with Special Reference to the Sperry Type.* (L.F.F., Vol. 19, No. 2, 20/3/42, pp. 23-24.)
1808	Nagel, M. ... ... Klughardt, A. ...	*Experiments on the Performance and Performance Impression of Telescopes.* (Z. f. Instrum., Vol. 62, No. 1, Jan., 1942, pp. 16-18.)
1810	Spaeth, W.... ...	*A Vibrating Table for Testing Instruments.* (Z.V.D.I., Vol. 81, No. 1, Jan., 1937, p. 12.)

TRANSLATION NUMBER AND AUTHOR.		TITLE AND REFERENCE.
		ELASTIC THEORY.
1817	Schiebold	*A Contribution to the Theory of the Measurement of Elastic Stresses in Materials by the X-Ray Interference Method.* (Berg und Hütte, Monatsheft, Vol. 86, No. 12, Dec., 1938, pp. 273-295.)
1803	——	*The Study of Residual Stresses Due to Bending.* (J. Tech. Phys., U.S.S.R., Vol. 9, No. 12, 1939, pp. 1,112-1,124.)
		WIRELESS.
1815	Ruckert, H. ...	*Apparatus for Measurements in the Ultra-Short Wave Band.* (F.T.M., No. 8, 1942, pp. 105-111.)
1792	Burkhard, O. ...	*Seasonal Vibrations in Height and Ionization of the V_2 Layer.* (H.F.T., Vol. 60, No. 4, Oct., 1942, pp. 97-99.)
1793	Grosskopf, J. ... Vogt, K.	*Measurements on the Propagation of Wave Over a Non-Homogenous Surface.* (H.F.T., Vol. 60, No. 4, Oct., 1942, pp. 97-99.)
1804	——	*Absolute Voltage Measurements in the Decimetre Wave Range.* (H.F.T., Vol. 58, No. 1, July, 1942, pp. 32-35.)

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Requests for further information or translations should be addressed to R.T.P.3, Ministry of Aircraft Production.

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Theory and Practice of Warfare.

Training and General Strategy.

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
1	9828	U.S.A. ...	*Office of War Information on U.S. Aircraft.* (R. H. Wood, Am. Av., Vol. 6, No. 11, 1/11/42, pp. 1 and 16.)
2	9877	U.S.A. ...	*Popular Names of the U.S. Military Aircraft.* (Am. Av., Vol. 6, No. 16, 15/1/43, p. 20.)
3	9887	U.S.A. ...	*The Master Weapon—The Aeroplane Sets the Pace in Modern Tactics.* (J. F. C. Fuller, Army Ordnance, Vol. 22, No. 134, Sept.-Oct., 1942.)
4	9890	U.S.A. ...	*Attack on Japan.* (H. Nickerson, Army Ordnance, Vol. 22, No. 134, Sept.-Oct., 1942, pp. 283-286.)
5	10065	U.S.A. ...	*Organisation and Work of the Army Ordnance Department.* (T. Lewis, Mech. Eng., Vol. 65, No. 2, Feb., 1943, pp. 101-104.)
6	10130	G.B.	*Education in the British Army.* (Nature, Vol. 151, No. 3,833, 17/4/43, pp. 438-440.)
7	10149	Africa ...	*Africa as an Air Base.* (N. Macmillan, Aeronautics, Vol. 8, No. 2, March, 1943, pp. 28-32.)
8	10150	U.S.S.R. ...	*Russian Reports on German Air Tactics.* (Aeronautics, Vol. 8, No. 2, March, 1943, p. 32.)
9	10153	G.B.	*Chief of Bomber Command.* (Aeronautics, Vol. 8, No. 2, March, 1943, p. 44.)
10	10250	U.S.A ...	*Will Aircraft Beat the U-Boat?* (J. A. Ward, Aero Digest, Vol. 43, No. 3, March, 1943, pp. 114-117.)

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11	10280	U.S.A. ...	*U.S. Army Air Forces Technical Training Centre in Atlantic City.* (F. R. Nelson, U.S. Air Services, Vol. 27, No. 12, Dec., 1942, pp. 13-14 and 41.)
12	10296	Canada ...	*Training Chinese Pilots in U.S.A.* (G. H. Copeland, Flying, Vol. 32, No. 3, March, 1943, pp. 26-27 and 114.)
13	10301	Canada ...	*Helicopters for War?* (R. Carter, Flying, Vol. 32, No. 3, March, 1943, pp. 38 and 138.)
14	10306	U.S.A. ...	*Observer School at Brooks Field.* (T. E. Bercaw, Flying, Vol. 32, No. 3, March, 1943, pp. 46-48 and 141.)
15	10376	U.S.A. ...	*Alaska-Russia-China Route Opened.* (Aviation, Vol. 41, No. 11, Nov., 1942, p. 256.)
16	10467	U.S.A. ...	*Sikorsky Helicopter Against Submarines.* (Inter. Avia., No. 862, 27/3/43, pp. 20-21.)
17	10468	G.B.	*Hurricanes as Tank Busters.* (Inter. Avia., No. 862, 27/3/43, p. 21.)
18	10507	U.S.A. ...	*Air Force Targets—Ruhr Dams and Water Power Stations.* (Engineer, Vol. 175, No. 4,558, 21/5/43, pp. 405-408.)
19	10551	G.B.	*25 Years of Progress in the R.A.F.* (Trade and Engineering Times, Vol. 52, No. 95, April, 1943, p. 33.)
20	10593	Canada ...	*Pre-Flight Training in Canada.* (B. Keith, Flying, Vol. 32, No. 5, May, 1943, pp. 48-50 and 146-150.)
			Design and Equipment of Military Aircraft.
21	9809	U.S.A. ...	*Polaroid Windscreen and Goggles for Blind Flying Training.* (Am. Av., Vol. 6, No. 19, 1/3/43, p. 30.)
22	9810	U.S.A. ...	*Seven-Man Rubber Boat for Use on the B-17.* (Am. Av., Vol. 6, No. 19, 1/3/43, p. 48.)
23	9813	U.S.A. ...	*Portable Metal Runway Laid by Royal Engineers on N. African Airfield (Photo).* (Am. Av., Vol. 6, No. 19, 1/3/43, p. 22.)
24	9880	U.S.A. ...	*New Aircraft Tank Cap.* (Am. Av., Vol. 6, No. 16, 15/1/43, p. 47.)
25	9973	U.S.A. ...	*Conversion of Bombers into Freighters.* (W. M. Sheehan, Am. Av., Vol. 6, No. 20, 15/3/43, pp. 14 and 32.)
26	9986	Germany ...	*Dornier 217 E Examination of De-Icing Equipment.* (Commercial Aviation, Vol. 4, No. 12, Dec., 1942, pp. 42-44.)
27	10151	Germany ...	*Junkers Aircraft—Genesis and Development of the Stuka.* (Aeronautics, Vol. 8, No. 2, March, 1943, pp. 34-41 and 61.)
28	10248	U.S.A. ...	*Nose of the Douglas B-19 (Photo).* (Aero Digest, Vol. 42, No. 3, March, 1943, p. 112.)
29	10356	U.S.A. ...	*Leading Edge Centre Section of the Vought-Sikorsky V.S.-44-A.C. (Design Detail).* (Aviation, Vol. 41, No. 11, Nov., 1942, p. 154.)

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30	10357	U.S.A. ...	*Details of Retractable Nose Wheel of the Tricycle Landing Gear of the Douglas C-54.* (Aviation, Vol. 41, No. 11, Nov., 1942, p. 154.)
31	10358	U.S.A. ...	*New Type Diving Brake Fitted to Dornier 217 and Detachable Tail Unit (Design Details).* (Aviation, Vol. 41, No. 11, Nov., 1942, p. 154.)
32	10360	U.S.A. ...	*Details of Elevator Control Torque Tube of the Vought-Sikorsky V.S.-44-A.* (Aviation, Vol. 41, No. 11, Nov., 1942, p. 157.)
33	10361	U.S.A. ...	*Retracting Landing Gear of Focke-Wulf 190 (Design Details).* (Aviation, Vol. 41, No. 11, Nov., 1942, p. 157.)
34	10362	U.S.A. ...	*Hull-Tail Frame Construction of the Vought-Sikorsky V.S.-44-A (Design Details).* (Aviation, Vol. 41, No. 11, Nov., 1942, p. 158.)
35	10363	U.S.A. ...	*Douglas A-20 Fuselage (Design Details).* (Aviation, Vol. 41, No. 11, Nov., 1942, p. 158.)
36	10364	U.S.A. ...	*Tail Wheel Installation of the North American Trainer (Design Details).* (Aviation, Vol. 41, No. 11, Nov., 1942, p. 158.)
37	10570	Germany ...	*Test and Development Work on the Do. 217.* (W. Zuerl, Motor Schau., Vol. 7, No. 3, March, 1943, pp. 95-97.)
38	10599	U.S.A. ...	*Novel Ski-Wheel Gear on North American Texan (AT-6, S.N.J.) (Photo).* (Flying, Vol. 32, No. 5, May, 1943, p. 70.)
			Armament.
39	9802	G.B.	*Battle of Fire Power vs. Fire Power.* (Canadian Aviation, Vol. 16, No. 1, Jan., 1943, pp. 55, 83-84.)
40	9854	G.B.	*Disposition of Fighter Armament—Firing Error Due to Installation in the Wings.* (D. I. Husk, Airc. Eng., Vol. 15, No. 170, April, 1943, pp. 94-97.)
41	9856	G.B.	*Enemy Aeroplane Weapons, 1939-1943.* (Airc. Eng., Vol. 15, No. 170, April, 1943, pp. 100-102.)
42	10313	U.S.A. ...	*U.S. Power Turrets.* (Flying, Vol. 32, No. 3, March, 1943, pp. 52-53.)
43	10368	U.S.A. ...	*Fire Power Details of Nazi Planes.* (Aviation, Vol. 41, No. 11, Nov., 1942, pp. 200-211.)
44	10473	U.S.A. ...	*The Fire Power of the Bell P-39 Airacobra (Photo graph).* (Inter. Avia., Vol. 6, No. 21, 1/4/23, p. 17.)
45	10591	Canada ...	*Fire Power of Allied and Axis Planes (Chart).* (Flying, Vol. 32, No. 5, May, 1943, p. 44.)
			Explosives, Ballistics.
46	9869	U.S.A. ...	*New Low-Level Bombsight (Photograph).* (Am. Av., Vol. 6, No. 17, 1/2/43, p. 48.)
47	9889	U.S.A. ...	*Unexploded Bombs (Disposal and Neutralization).* (F. J. Kane, Army Ordnance, Vol. 22, No. 134, Sept.-Oct., 1942, pp. 277-282.)
48	10339	U.S.A. ...	*Low-Level Bombsight.* (Canadian Av., Vol. 15, No. 12, Dec., 1942, p. 160.)

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49	10359	U.S.A. ...	*Details of Bomb Racks of Twin-Engine Manchester Bomber.* (Aviation, Vol. 41, No. 11, Nov., 1942, p. 154.)
50	10503	U.S.A. ...	*Bomb Scoring by Seismograph* (*Location of Bomb Impact by Seismograph*). (Sci. Am., Vol. 168, No. 3, March, 1943, pp. 128-129.)
51	10532	Germany ...	*Approximation to Field Artillery Trajectories by Means of Parabolas.* (W. Haist, Z.G.S.S., Vol. 38, No. 3, March, 1943, pp. 45-47.)
52	10533	Germany ...	*The Artificial Drying of Explosives.* (E. Glucklich, Z.G.S.S., Vol. 38, No. 3, March, 1943, pp. 48-50.)
53	10534	Germany ...	*Internal Ballistics—Effect of Gas Inertia with Special Reference to the Acceleration of Charge.* (H. Pfrien, Z.G.S.S., Vol. 38, No. 2, Feb., 1943, pp. 21-25.)
54	10537	Germany ...	*Influence of Target Supports on Effects of Projectile.* (M. Gercke, Z.G.S.S., Vol. 38, No. 2, Feb., 1943, pp. 29-32.)
			Military Types Aircraft (British).
55	9834	G.B.	*British Lancaster* (*Photo*). (Am. Av., Vol. 6, No. 11, 1/11/42, p. 16.)
56	9837	G.B.	*Miles' Master III Trainer* (*Photo*). (Am. Av., Vol. 6, No. 11, 1/11/42, p. 19.)
57	9963	G.B.	*Hawker Typhoon Single-Seater Fighter.* (Engineer, Vol. 175, No. 4,556, 7/5/43, p. 366.)
58	9964	G.B.	*The De Havilland Mosquito.* (Engineer, Vol. 175, No. 4,556, 7/5/43, pp. 373-375.)
59	10239	G.B.	*The Mosquito and the Hawker Typhoon Aircraft.* (Engineering, Vol. 155, No. 4,055, 14/5/43, p. 385.)
60	10297	Canada ...	*The Hurricane.* (Sir F. S. Spriggs, Flying, Vol. 32, No. 3, March, 1943, pp. 28-29 and 120-122.)
61	10311	G.B.	*Handley Page "Hampden"* (*Silhouette*). (Flying, Vol. 32, No. 3, March, 1943, p. 51.)
62	10327	G.B.	*Anson V Made of Moulded Plywood.* (Canadian Av., Vol. 15, No. 12, Dec., 1942, pp. 96-98.)
63	10456	G.B.	*Miles' M. 18 and M. 28 Trainers.* (Inter. Avia., No. 862, 27/3/43, p. 12.)
64	10550	G.B.	*Hawker Typhoon.* (Trade and Engineering Times, Vol. 52, No. 95, April, 1943, p. 32.)
65	10554	G.B.	*The Whirlwind as a Fighter Bomber.* (Trade and Engineering Times, Vol. 52, No. 95, April, 1943, p. 36.)
			Military Types Aircraft (U.S.S.R.).
66	10454	U.S.S.R. ...	*L.A.G.G.-3 Fighter.* (Inter. Avia., No. 862, 27/3/43, pp. I and 10-11.)
67	10455	U.S.S.R. ...	*P.E.-2 Twin-Engined Bomber.* (Inter. Avia., No. 862, 27/3/43, pp. 11-12.)
			Military Types Aircraft (U.S.A. and Mexico).
68	10004	U.S.A. ...	*New Curtiss Dive-Bomber* (*Photograph*). (Autom. Ind., Vol. 88, No. 4, 15/2/43, p. 54.)

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69	10062	U.S.A. ...	*Curtiss Dive Bombers (14 Years of Development).* (Curtiss Flyleaf, Vol. 25, No. 4, Sept.-Oct., 1942, pp. 10-13.)
70	10076	U.S.A. ...	*The "Sentinel" for Army Co-operative Work (Photograph) (Built by the Vultee Aircraft Inc.).* (Mech. Eng., Vol. 65, No. 1, Jan., 1943, p. 51.)
71	10078	U.S.A. ...	*Curtiss S.B. 2 C-1—Helldiver (Photograph).* (Curtiss Flyleaf, Vol. 25, No. 5, Nov.-Dec., 1942, p. 6.)
72	10081	U.S.A. ...	*Curtiss Wright Aircraft, 1943 (Photograph).* (Curtiss Flyleaf, Vol. 25, No. 5, Nov.-Dec., 1942, pp. 16-17.)
73	10148	U.S.A. ...	*Vought-Sikorsky Helicopter (with Pontoons, Photograph).* (Aeronautics, Vol. 8, No. 2, March, 1943, p. 73.)
74	10154	U.S.A. ...	*Lockheed Vega Ventura.* (Aeronautics, Vol. 8, No. 2, March, 1943, pp. 48-49.)
75	10227	U.S.A. ...	*Thunderbolt Fighter Aircraft.* (Engineer, Vol. 175, No. 4,557, 14/5/43, p. 398.)
76	10251	Mexico ...	*Mexican Plastic Plywood Light Plane "Tezinthan" (Photograph).* (Aero Digest, Vol. 42, No. 3, March, 1943, p. 118.)
77	10262	U.S.A. ...	*The Bell "Airacobra" (Including Sketches of Wing Panel, etc.).* (Aero Digest, Vol. 42, No. 3, March, 1943, pp. 256-257.)
78	10305	U.S.A. ...	*High Wing Curtiss O-52 (Photograph).* (Flying, Vol. 32, No. 3, March, 1943, p. 46.)
79	10307	U.S.A. ...	*Boeing P.T. 17 (Stearman) Trainer (Photograph).* (Flying, Vol. 32, No. 3, March, 1943, p. 48.)
80	10309	U.S.A. ...	*North American "Mustang" (P.S. 1) (Photograph).* (Flying, Vol. 32, No. 3, March, 1943, p. 50.)
81	10310	U.S.A. ...	*Curtiss "Helldiver" (S.B.2C.) (Silhouette).* (Flying, Vol. 32, No. 3, March, 1943, p. 50.)
82	10314	U.S.A. ...	*The Lockheed "Hudson" Trainer AT-18 (Photograph).* (Flying, Vol. 32, No. 3, March, 1943, p. 60.)
83	10315	U.S.A. ...	*Vultee Vengeance (A-31) Dive Bomber (Photograph).* (Flying, Vol. 32, No. 3, March, 1943, p. 61.)
84	10328	U.S.A. ...	*North American B-25 Bomber (Photo).* (Canadian Av., Vol. 15, No. 12, Dec., 1942, p. 92.)
85	10338	U.S.A. ...	*Stimson-Vega "Sentinel" and "Reliant" (Liaison and Trainer) (Photo).* (Canadian Aviation, Vol. 15, No. 12, Dec., 1942, p. 160.)
86	10341	U.S.A. ...	*Twin-Engine Planes to Train Bomber Crews, AT Series (Silhouettes).* (Aviation, Vol. 41, No. 11, Nov., 1942, p. 100.)
87	10366	U.S.A. ...	*Vought-Sikorsky F4U Corsair (Photograph).* (Aviation, Vol. 41, No. 11, Nov., 1942, p. 189.)
88	10379	U.S.A. ...	*American Aircraft and Their Combat Performance.* (Aviation, Vol. 41, No. 11, Nov., 1942, pp. 92-93 and 275-276.)
89	10404	U.S.A. ...	*Sikorsky Helicopter (Photograph).* (Autom. Ind., Vol. 88, No. 5, 1/3/43, p. 42.)

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90	10418	U.S.A. ...	*Plywood Primary Trainers for Army, Ryan P.T.-25.* (Autom. Ind., Vol. 88, No. 1, 1/1/43, pp. 24-25 and 54.)
91	10457	U.S.A. ...	*Boeing 17E and 17F (Fortress II).* (Inter. Avia., No. 862, 27/3/43, pp. 14-15.)
92	10459	U.S.A. ...	*New Version of Douglas DB-7 (Havoc and Boston).* (Inter. Avia., No. 862, 27/3/43, pp. 15-16.)
93	10460	U.S.A. ...	*Bell P-39 Airacobra.* (Inter. Avia., No. 862, 27/3/43, p. 17.)
94	10462	U.S.A. ...	*Martin 167 Maryland Light Bomber.* (Inter. Avia., No. 862, 27/3/43, p. 16.)
95	10463	U.S.A. ...	*Curtiss Helldiver.* (Inter. Avia., No. 862, 27/3/43, pp. 1 and 16.)
96	10464	U.S.A. ...	*Vultee Vengeance Dive Bomber.* (Inter. Avia., No. 862, 27/3/43, p. 16.)
97	10471	U.S.A. ...	*Boeing A.T.-15 Advanced Trainer.* (Inter. Avia., No. 862, 27/3/43, p. 1.)
98	10474	U.S.A. ...	*Noordwyn U.C.-64 (Photograph).* (American Aviation, Vol. 6, No. 21, p. 52.)
99	10562	U.S.A. ...	*Curtiss A-25 U.S. Army Dive Bomber (Photo).* (U.S. Air Services, Vol. 28, No. 2, Feb., 1943, p. 36.)
100	10589	U.S.A. ...	*Lockheed Lightnings (P-38) in Africa.* (W. J. Hoelle, Flying, Vol. 32, No. 5, May, 1943, pp. 24-25 and 136.)
101	10597	U.S.A./ Germany ...	*North American Mustang, Focke-Wulf 190 and Me. 109 (Silhouettes).* (Flying, Vol. 32, No. 5, May, 1943, p. 67.)
102	10598	U.S.A. and G.B. ...	*Curtiss "Warhawk" and Avro Lancaster (Silhouettes).* (Flying, Vol. 32, No. 5, May, 1943, p. 68.)
103	9806	U.S.A. ...	*Fairchild Plywood Advanced Trainer.* (Canadian Aviation, Vol. 16, No. 1, Jan., 1943, p. 104.)
104	9811	U.S.A. ...	*Curtiss A-25 Army "Helldiver" (Photo).* (Am. Av., Vol. 6, No. 19, 1/3/43, p. 46.)
105	9812	U.S.A. ...	*Vought-Sikorsky Helicopter V.S.-300.* (Am. Av., Vol. 6, No. 19, 1/3/43, p. 44.)
106	9821	U.S.A. ...	*Inspecting Liberator (B-24) Heavy Bombers.* (Autom. Ind., Vol. 88, No. 2, 15/1/43, pp. 40-41.)
107	9826	U.S.A. ...	*The Consolidated C-87 (Photograph).* (Autom. Ind., Vol. 88, No. 2, 15/1/43, p. 48.)
108	9829	U.S.A. ...	*Flying Fortress (Photo).* (Am. Av., Vol. 6, No. 11, 1/11/42, p. 8.)
109	9831	U.S.A. ...	*North American P-51 "Mustang" (Photo).* (Am. Av., Vol. 6, No. 11, 1/11/42, p. 13.)
110	9833	U.S.A. ...	*Martin B-26 (Photo).* (Am. Av., Vol. 6, No. 11, 1/11/42, p. 16.)
111	9847	U.S.A. ...	*Ryan Plywood Trainer (Photo).* (Am. Av., Vol. 6, No. 11, 1/11/42, p. 48.)
112	9857	U.S.A. ...	*New R.A.F. Types—The Martin Maryland, Martin Marauder, Martin Baltimore.* (Airc. Eng., Vol. 15, No. 170, April, 1943, pp. 103-105 and 114.)
113	9883	U.S.A. ...	*Grumman T.B.F.-1 Avenger (Photograph).* (Am. Av., Vol. 6, No. 16, 15/1/43, p. 80.)

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114	9894	U.S.A. ...	*American Maryland Bomber in Egypt* (*Photo*). (Army Ordnance, Vol. 22, No. 134, Sept.-Oct., 1942, p. 302.)
115	9974	U.S.A. ...	*Stimson L-S Vultee's Liaison Plane* (*Photograph*). (Am. Av., Vol. 6, No. 20, 15/3/43, p. 19.)
116	9978	U.S.A. ...	*Curtiss-Wright's Scout Observation Plane SO3 C-1, The Seamew* (*Photograph*). (Am. Av., Vol. 6, No. 20, 15/3/43, p. 27.)
117	9989	U.S.A. ...	*P-47 Thunderbolt* (*Photograph*). (Commercial Aviation, Vol. 4, No. 12, Dec., 1942, p. 86.)
118	9991	U.S.A. ...	*New Canso* (*Catalina*) (*Photograph*). (Commercial Aviation, Vol. 4, No. 12, Dec., 1942, p. 90.)
119	9993	U.S.A. ...	*Fairchild Plywood Trainer*. (Commercial Aviation, Vol. 4, No. 12, Dec., 1942, p. 102.)
			Military Types Aircraft (*Germany*).
120	9832	Germany ...	*German Focke-Wulf* 190 (*Photo*). (Am. Av., Vol. 6, No. 11, 1/11/42, p. 13.)
121	9938	Germany ...	*Messerschmitt* 110, *Details of Germany's Mass Produced Fighter*. (J. E. Thompson, Paper Presented by the S.A.W.E.)
122	10147	Germany & U.S.S.R. ...	*New German and Russian Aircraft on Russian Front Me.* 115 *and Heinkel* 117. (Aeronautics, Vol. 8, No. 2, March, 1943, p. 73.)
123	10265	Germany ...	*The Messerschmitt* 210 *A-1*. (Aero Digest, Vol. 42, No. 3, March, 1943, pp. 267-268, 389-399.)
124	10312	Germany ...	*Focke-Wulf F.W.* 189 (*Silhouette*). (Flying, Vol. 32, No. 3, March, 1943, p. 51.)
125	10377	Germany ...	*New Allied and Axis Planes*. (Aviation, Vol. 41, No. 11, Nov., 1942, p. 261.)
126	10453	Germany ...	*Messerschmitt Me.* 210 *Long Range Fighter*. (Inter. Avia., No. 862, 27/3/43, pp. 8-9.)
127	10553	Germany ...	*New German Aircraft*. (Trade and Engineering Times, Vol. 52, No. 95, April, 1943, p. 35.)
128	10573	Germany ...	*Me.* 109 *and Me.* 110 (*Sectional Drawings*). (Motor Schau., Vol. 7, No. 3, March, 1943, pp. 108-109.)
129	10592	Germany ...	*Messerschmitt Me.* 201 *A1* (*Drawing*). (Flying, Vol. 32, No. 5, May, 1943, p. 45.)
130	10603	Germany ...	*Junkers Ju.* 90. (Flying, Vol. 32, No. 5, May, 1943, p. 80.)
			Military Types Aircraft (*Japan*).
131	9830	Japan ...	*Japanese OO Fighter* (*Photo*). (Am. Av., Vol. 6, No. 11, 1/11/42, p. 10.)
132	9896	Germany and Japan ...	*Characteristics of Enemy Aircraft* (*German and Japanese*). (Army Ordnance, Vol. 22, No. 134, Sept.-Oct., 1942, pp. 321-322.)
133	10308	Japan ...	*Mitsubishi Zero* (*Revised Photograph*). (Flying, Vol. 32, No. 3, March, 1943, p. 49.)
			Military Types Aircraft (*Italy*).
134	10084	Italy	*Piaggio P.* 108 *Long Range Bomber* (*Photo*). (Luftwissen, Vol. 10, No. 3, March, 1943, p. 68.)

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				Troop Transport and Ambulance Planes.
135	9816	U.S.A.	...	*Curtiss Caravan C. 76 Transport.* (Autom. Ind., Vol. 88, No. 2, 15/1/43, pp. 26-27.)
136	9865	U.S.A.	...	*Lockheed Constellation (Photograph)* (Am. Av., Vol. 6, No. 17, 1/2/43, p. 21.)
137	9876	U.S.A.	...	*The New Lockheed Constellation Four-Engined Transport C-69.* (Am. Av., Vol. 6, No. 16, 15/1/43, pp. 15 and 23.)
138	9878	G.B. ...	...	*Hydroplane Used by the R.A.F. for Rescue Work (Photograph).* (Am. Av., Vol. 6, No. 16, 15/1/43, p. 26.)
139	10060	U.S.A.	...	*Curtiss Caravan Transport.* (Curtiss Flyleaf, Vol. 25, No. 4, Sept.-Oct., 1942, pp. 3-7.)
140	10080	U.S.A.	...	*Curtiss Commando Twin-Engine Transport (Photograph of Spacious Fuselage).* (Curtiss Flyleaf, Vol. 25, No. 5, Nov.-Dec., 1942, pp. 8-10.)
141	10082	U.S.A.	...	*Curtiss Caravan C-76 Wooden Cargo Transport.* (Curtiss Flyleaf, Vol. 25, No. 5, Nov.-Dec., 1942, pp. 18-19.)
142	10249	U.S.A.	...	*Douglas "Sky Train" Military Transport (Photograph).* (Aero Digest, Vol. 42, No. 3, March, 1943, p. 113.)
143	10300	U.S.A.	...	*Lockheed Constellation.* (P. Pierce, Flying, Vol. 32, No. 3, March, 1943, pp. 35 and 126.)
144	10330	U.S.A.	...	*Consolidated C-87 Army Transport (Photo).* (Canadian Av., Vol. 15, No. 12, Dec. 12, p. 164.)
145	10405	U.S.A.	...	*Consolidated P4Y-1 Flying Boat (Model 31) (Photograph).* (Autom. Ind., Vol. 88, No. 5, 1/3/43, p. 43.)
146	10423	U.S.A.	...	*Air Ambulance for Navy Fliers (Piper) (Photograph).* (Autom. Ind., Vol. 88, No. 1, 1/1/43, p. 50.)
147	10458	U.S.A.	...	*Consolidated 31 Flying Boat (Military Version).* (Inter. Avia., No. 862, 27/3/43, pp. I and 15.)
148	10461	U.S.A.	...	*Douglas Transports (C47, C53, C54).* (Inter. Avia., No. 862, 27/3/43, p. 16.)
149	10469	G.B. ...	...	*Armstrong Whitworth Ensign (Transport Plane).* (Inter. Avia., No. 862, 27/3/43, p. 28.)
150	10470	Germany	...	*Messerschmitt Me. 323 Transport (Photo).* (Inter. Avia., No. 862, 27/3/43, p. I.)
151	10556	U.S.A.	...	*America's Biggest Transport Plane the "Constellation" (Photo).* (U.S. Air Services, Vol. 28, No. 2, Feb., 1943, pp. 16-17 and 44.)
152	10561	U.S.A.	...	*Curtiss "Caravan" All Wood Transport (Photo).* (U.S. Air Services, Vol. 28, No. 2, Feb., 1943, p. 40.)
				Gliders.
153	9781	U.S.A.	...	*Waco Troop-Carrying Glider (Photo).* (Autom. Ind., Vol. 87, No. 5, 1/9/42, p. 52.)
154	9782	U.S.A.	...	*The C.G. 4a 15-Seater Glider Used by Army Air Forces (Photograph).* (Autom. Ind., Vol. 87, No. 5, 1/9/42, p. 58.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
155	9866	U.S.A. ...	*Waco C.G.-4 Glider Inloading Jeep (Photograph).* (Am. Av., Vol. 6, No. 17, 1/2/43, p. 28.)
156	10074	U.S.A. ...	*Cargo Glider Pick-Up.* (R. C. du Pont, Mech. Eng., Vol. 65, No. 1, Jan., 1943, pp. 35-39.)
157	10145	France ...	*French Glider S.O.P.-1.* (Aeronautics, Vol. 8, No. 2, March, 1943, p. 59.)
158	10278	U.S.A. ...	*The New Boeing Glider C.G.-4 (Photograph).* (U.S. Air Services, Vol. 27, No. 12, Dec., 1942, p. 17.)
159	10465	U.S.A. ...	*Seaworthy Troop-Carrying Glider Bristol XLQ-1.* (Inter. Avia., No. 862, 27/3/43, pp. I and 17.)
160	10472	U.S.A. ...	*U.S. Navy's Seaplane Glider XLRQ-1.* (American Aviation, Vol. 6, No. 21, 1/4/43, p. 16.)
161	10557	U.S.A. ...	*The Glider in War and Peace.* (R. S. Findley, U.S. Air Services, Vol. 28, No. 2, Feb., 1943, pp. 24 and 44.)
			Fleet Air Arm.
162	9804	G.B.	*"Seafire" Taking-off from Aircraft Carrier (Photo).* (Canadian Aviation, Vol. 16, No. 1, Jan., 1943, p. 64.)
163	9867	U.S.A. ...	*Naval Air Transport Service.* (Am. Av., Vol. 6, No. 17, 1/2/43, pp. 18 and 28.)
164	9893	U.S.A. ...	*Wings for the Navy (Photographs of Representative American Naval Aircraft).* (Army Ordnance, Vol. 22, No. 134, Sept.-Oct., 1942, pp. 293-300.)
165	10079	U.S.A. ...	*Curtiss S.O. 3 C-1 Seagull (Photograph).* (Curtiss Flyleaf, Vol. 25, No. 5, Nov.-Dec., 1942, p. 6.)
166	10260	U.S.A. ...	*Curtiss "Seagull" (S.O. 3 C-1) Scout Observation Plane for Fleet Air Arm (Photograph).* (Aero Digest, Vol. 42, No. 3, March, 1943, p. 242.)
167	10279	U.S.A. ...	*The Brewster Navy "Buccaneer" (Photograph).* (U.S. Air Services, Vol. 27, No. 12, Dec., 1942, p. 32.)
168	10304	U.S.A. ...	*U.S. Aircraft Carriers.* (F. Tupper, Flying, Vol. 32, No. 3, March, 1943, pp. 42-44 and 139.)
169	10367	U.S.A. ...	*U.S. Navy K Type Blimp for Naval Coastal Patrol.* (E. H. Forbes, Aviation, Vol. 41, No. 11, Nov., 1942, pp. 197-199.)
170	10373	U.S.A. ...	*S.O.R.-1Combat Plane for U.S. Navy (Ryan).* (Aviation, Vol. 41, No. 11, Nov., 1942, p. 251.)
171	10564	Germany ...	*Early Types of German U Boats.* (Motor Schau., Vol. 7, No. 2, Feb., 1943, pp. 46-48.)
172	10590	Canada ...	*Aircraft Carriers.* (B. Gruenwald, Flying, Vol. 32, No. 5, May, 1943, pp. 39-41.)
173	10601	U.S.A. ...	*Naval Version of Vega "Ventura" (PV-1).* (Flying, Vol. 32, No. 5, May, 1943, p. 71.)
			A.R.P. and A.A.
174	9886	U.S.A. ...	*105 mm. Howitzer on Self-Propelled Armoured Mount (Photo).* (Army Ordnance, Vol. 22, No. 134, Sept.-Oct., 1942, p. 265.)
175	9892	U.S.A. ...	*Air Raid Defence.* (G. J. B. Fisher, Army Ordnance, Vol. 22, No. 134, Sept.-Oct., 1942, pp. 290-292.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
176	9897	U.S.A.	... *Dustproof Cover for 40 mm. Anti-Aircraft Gun (Photo).* (Army Ordnance, Vol. 22, No. 134, Sept.-Oct., 1942, p. 317.)
177	9898	U.S.A.	... *Covers for 155 mm. and 105 mm. Howitzers (Photo).* (Army Ordnance, Vol. 22, No. 134, Sept.-Oct., 1942, pp. 318-319.)
178	10236	G.B. ...	... *A Method of Demonstrating the Identification of War Gases.* (H. W. Keenan and R. S. Law, Chem. and Industry, Vol. 62, No. 20, 15/5/43, pp. 182-184.)
179	10244	U.S.A.	... *Protection of Civilians from Vesicant Agents.* (T. F. Bradley and others, Ind. Eng. and Chem. (News Ed.), Vol. 21, No. 6, March, 1943, pp. 373-375.)
180	10331	Canada	... *Canada's Aircraft Detection Corps (Spotters).* (Canadian Av., Vol. 15, No. 12, Dec., 1942, p. 164.)

Aero and Hydrodynamics.

General Aerofoil Theory.

181	10109	Holland	... *Effect of a Rotating Cylinder Placed in the Nose of an Aerofoil on its Aerodynamic Characteristics.* (E. B. Wolff and C. Koning, Rykstudiedienst Voor Luchvaart, Vol. 3, 1925, Report 96a; Vol. 4, 1927, Reports 98a, 105a and 130a.)
182	10179	Germany	... *Aerodynamic Force on a Harmonically Vibrating Wing in a Supersonic Field of Flow (Two-Dimensional Case).* (S. Borbely, Z.A.M.M., Vol. 22, No. 4, Aug., 1942, pp. 190-205.)
183	10203	Germany	... *The Theory of the Lifting Wing.* (I. Nikuradse and E. Mohr, L.F.F., Vol. 20, No. 2, 27/2/43, pp. 48-56.)
187	10560	U.S.A.	... *Glenn Martin Graphic Solution of the Flutter Problem.* (U.S. Air Services, Vol. 28, No. 2, Feb., 1943, p. 33.)

Laminar and Turbulent Flow.

188	10476	U.S.A.	... *Heat Transfer and Pressure Drop in Annuli.* (E. S. Davis, A.S.M.E. Preprint, April 26-28, 1943, pp. 1-5.)

Wind Tunnels and Research.

191	10008	U.S.A.	... *Survey of Papers Presented at the Eleventh Annual Meeting of the Institute of Aeronautical Sciences.* (Autom. Ind., Vol. 88, No. 4, 15/2/43, pp. 24-26, 42 and 78.)
192	10083	U.S.A.	... *Curtiss 700 Miles per Hour Wind Tunnel (including Cutaway Perspective Drawing).* (Curtiss Flyleaf, Vol. 25, No. 5, Nov.-Dec., 1942, pp. 22-23.)
193	10276	U.S.A.	... *New U.S.A. Wind Tunnels.* (Aero Digest, Vol. 42, No. 3, March, 1943, p. 428.)
194	10374	U.S.A.	... *N.A.C.A.'s New Research Programme.* (Aviation, Vol. 41, No. 11, Nov., 1942, p. 251.)
195	10375	U.S.A.	... *New North American Wind Tunnel.* (Aviation, Vol. 41, No. 11, Nov., 1942, p. 252.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
			General Hydrodynamics.
196	9946	U.S.A.	... *Some Aspects of Water Loads Problem.* (Paper Presented by the S.A.W.E.)
197	10028	U.S.A.	... *Performance and Selection of Mechanical Draft Cooling Towers.* (J. Lichtenstein, A.S.M.E. Preprint, April 26-28, 1943.)
198	10035	U.S.A.	... *Graphical Solution of Fluid Friction Function Problem (Discussion).* (E. S. Dennison, J. App. Mech., Vol. 10, No. 1, March, 1943, pp. 51-52.)
199	10133	G.B. ...	... *Theory of the Sea Waves.* (P. J. H. Unna, Nature, Vol. 151, No. 3,834, 24/4/43, pp. 479-480.)
200	10178	Germany	... *Field of Flow Due to Slow Rotation of Two Eccentric Cylinders in a Viscous Fluid.* (W. Muller, Z.A.M.M., Vol. 22, No. 4, Aug., 1942, pp. 177-189.)
201	10204	Germany	... *Influence of Cross-Sectional Area of the Surge Chamber on the Fluctuation of the Water Level, During Inflow Control of Hydraulic Turbines.* (W. Richter, Ing. Archiv., Vol. 13, No. 6, 1943, pp. 331-342.)
202	10238	G.B. ...	... *Breakwaters (Contd.).* (R. R. Minikin, Engineering, Vol. 155, No. 4,035, 14/5/43, pp. 381-382.)
			Flow in Tubes and Pipes.
203	10026	U.S.A.	... *Heat Transfer to a Fluid Flowing Periodically at Low Frequencies in a Vertical Tube.* (R. C. Martinelli and others, A.S.M.E. Preprint, April 26-28, 1943.)
204	10031	U.S.A.	... *Relationship Between Reynolds Number and Velocity Distribution in a Pipe.* (L. S. Rhodes, J. App. Mech., Vol. 10, No. 1, March, 1943, pp. 21-22.)
			Aircraft, Airscrews and Accessories.
			Civil Aviation and Air Cargo.
205	9815	U.S.A.	... *Freight Transport by Air in Latin America (Partially Cut by Censor).* (J. P. Zandt, Autom. Ind., Vol. 88, No. 2, 15/1/43, pp. 24-25, 84-85.)
206	10090	Germany	... *The First Towed Glider Flights* (1919-1920). (M. Bohm, Luftwissen, Vol. 10, No. 3, March, 1943, pp. 86-87.)
207	10144	G.B. ...	... *Air Travel*—1950. (D. C. Greenwood, Aeronautics, Vol. 8, No. 2, March, 1943, pp. 56-57.)
208	10247	U.S.A.	... *Commercial Aviation After the War (Review of New Manufacturing Technique).* (B. C. Boulton, Aero Digest, Vol. 42, No. 3, March, 1943, pp. 111-113, 138-140 and 386-398.)
209	10269	U.S.A.	... *Some Observations on the Post-War Planning of the Aircraft Industry.* (S. Siggia, Aero Digest, Vol. 42, No. 3, March, 1943, pp. 368 and 405-406.)
210	10294	Canada	... *Land Planes or Flying Boats for Cargo?* (T. P. Hall, Vol. 32, No. 3, March, 1943, pp. 20-21 and 124.)

ITEM NO.	R.T.P. REF.			TITLE AND JOURNAL.
211	10346	U.S.A.	...	*The Future of Water-Based Planes, VI.* (F. T. Courtney, Aviation, Vol. 41, No. 11, Nov., 1942, pp. 122-123, 284 and 288.)
212	10370	U.S.A.	...	*Cargo Planes for World Trade.* (G. F. Bauer, Aviation, Vol. 41, No. 11, Nov., 1942, pp. 213-217 and 280.)
213	10394	U.S.A.	...	*Requirements in Air Cargo Carriers (Symposium of Papers).* (Autom. Ind., Vol. 88, No. 5, 1/3/43, pp. 14-18.)
214	10424	U.S.A.	...	*Air Cargo Stimulated by Urgencies of War (Article Incomplete).* (Autom. Ind., Vol. 88, No. 1, 1/1/43, pp. 36-37 and 68-72.)
215	10493	G.B.	...	*Post-War Civil Aviation.* (Engineer, Vol. 175, No. 4,559, 28/5/43, p. 436.)
216	10495	U.S.A.	...	*Industrial Air Control.* (M. Ingles, Sci. Am., Vol. 168, No. 3, March, 1943, pp. 104-106.)
217	10509	G.B.	...	*Aviation After the War.* (Engineer, Vol. 175, No. 4,558, 21/5/43, p. 410.)
218	10552	G.B.	...	*Post-War Aviation.* (Trade and Engineering Times, Vol. 52, No. 95, April, 1943, p. 34.)
				Civil and Special Aircraft Types.
219	9803	U.S.A.	...	*Lockheed "Excalibur" Commercial Landplane Under Development.* (Canadian Aviation, Vol. 16, No. 1, Jan., 1943, p. 56.)
220	9835	U.S.A.	...	*New Version of the "Flying Wing" Patented.* (D. R. Davis, Am. Av., Vol. 6, No. 11, 1/11/42, p. 16.)
221	9983	U.S.A.	...	*New Aeronca Cargo Plane (Photograph).* (Am. Av., Vol. 6, No. 20, 15/3/43, p. 66.)
222	10466	France	...	*Mauboussin M 129, M 202, M 300 (Trainers), M 400 Cargo Plane.* (Inter. Avia., No. 862, 27/3/43, p. 19.)
				General Design and Construction.
223	9859	G.B.	...	*Stressed Skin Wooden Construction.* (W. Stepniewski, Airc. Eng., Vol. 15, No. 170, April, 1943, pp. 110-112.)
224	9928	Germany	...	*Calculation of Power Required for Operating (Variable Camber) Wing Flap.* (K. Wolf, Luftwissen, Vol. 10, No. 2, Feb., 1943, pp. 53-57.)
225	10152	G.B.	...	*The Effect of Compromise on the Design of Aircraft.* (Aeronautics, Vol. 8, No. 2, March, 1943, pp. 42-44.)
226	10155	G.B.	...	*Fairey Jet Propulsion Patent.* (Aeronautics, Vol. 8, No. 2, March, 1943, p. 50.)
227	10317	U.S.A.	...	*The Nose of the Aerofoil.* (R. J. Hoffmann, Flying, Vol. 32, No. 3, March, 1943, pp. 63 and 149-151.)
228	10318	U.S.A.	...	*Steel Fuselage Panels to Replace Aluminium in Vultee Aircraft.* (Flying, Vol. 32, No. 3, March, 1943, pp. 91-92.)
229	10343	U.S.A.	...	*Wood Techniques Developed in Glider Construction.* (Aviation, Vol. 41, No. 11, Nov., 1942, pp. 108-112.)

ITEM NO.	R.T.P. REF.			TITLE AND JOURNAL.
230	10344	U.S.A.	...	*Design Considerations for Plywood Structures.* (L. J. Marhoefer, Aviation, Vol. 41, No. 11, Nov., 1942, pp. 114-117 and 340.)
231	10381	Germany	...	*Stressing of Aircraft Wheels.* (*R.T.P. Translation No.* 1,547.) (H. Burkhardt, J. Roy. Aeron. Sci., Vol. 47, No. 389, May, 1943, pp. 133-137.)
232	10382	U.S.S.R.	...	*Plastics and Their Application to Aircraft Construction.* (*R.T.P. Translation No.* 1,600.) (J. I. Zhibitsky, J. Roy. Aeron. Sci., Vol. 47, No. 389, May, 1943, pp. 138-143.)
233	10538	G.B. ...	...	*Stressed Skin Wooden Construction (Contd.).* (W. Stepniewski, Airc. Eng., Vol. 15, No. 171, May, 1943, pp. 126-131.)
234	10604	Canada	...	*Non-Skid Tyre for Icy Landings.* (Flying, Vol. 32, No. 5, May, 1943, p. 116.)
				Weight and Balance Control.
235	9915	U.S.A.	...	*Soc. of Aeron. Weight Engs. Year Book,* 1933. (Vol. 3, No. 1, 1943.)
236	9916	U.S.A.	...	*Soc. of Aeron. Weight Engs. Year Book,* 1942. (Vol. 2, No. 1, 1942.)
237	9929	U.S.A.	...	*Aeroplane Weight and Balance Control.* (S. R. Shatto, Papers Presented by S.A.W.E.)
238	9930	U.S.A.	...	*Aircraft Accessories—A Weighty Problem.* (E. C. Roberts, Papers Presented by S.A.W.E.)
239	9931	U.S.A.	...	*Weight Engineer and the Flutter Problem.* (P. E. Bisch, Papers Presented by S.A.W.E.)
240	9932	U.S.A.	...	*Relationship of Identification Numbers to Weight and Cost Control.* (D. R. Watson, Papers Presented by S.A.W.E.)
241	9934	U.S.A.	...	*Predetermination of Weight Efficiency.* (D. M. Cole, and S. J. Hutchinson, Paper Presented by S.A.W.E.)
242	9935	U.S.A.	...	*A Practical Method for Wing Weight Estimation.* (C. R. Engleby, Paper Presented by the S.A.W.E.)
243	9936	U.S.A.	...	*Aircraft Balancing and Centre of Gravity Control.* (W. A. Senior, Paper Presented by the S.A.W.E.)
244	9937	U.S.A.	...	*Calculations of Landing Gear and Hydraulic System Weights.* (H. W. Adams, Papers Presented by the S.A.W.E.)
245	9939	U.S.A.	...	*Weight Control—Aircraft Design Problems.* (E. J. Foley, Paper Presented by the S.A.W.E.)
246	9940	U.S.A.	...	*Will Accessories Impede Our Payload?* (L. R. Hackney, Paper Presented by S.A.W.E.)
247	9941	U.S.A.	...	*Weight Predictor.* (C. Merrill, Paper Presented by the S.A.W.E.)
248	9942	U.S.A.	...	*Organisation for Weight Control.* (J. E. Ayers, Paper Presented by the S.A.W.E.)
249	9943	U.S.A.	...	*Weight Saving by Cleaning Aircraft.* (R. E. Sargent, Paper Presented by the S.A.W.E.)
250	9944	U.S.A.	...	*Applications of Psychology to Weight Control.* (W. A. Martin, Paper Presented by the S.A.W.E.)

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251	9945	U.S.A.	... *The Importance of Weight Control in Airline Operations.* (C. Froesch, Paper Presented by the S.A.W.E.)
252	9949	U.S.A.	... *Weight Economy.* (J. E. Ayers, Papers Presented by the S.A.W.E.)
			Performance and Testing.
253	9798	U.S.A.	... *Stratosphere Chamber for Testing Mechanical Parts of Aircraft and Radio.* (Metal Progress, Vol. 42, No. 5, Nov., 1942, p. 944.)
254	9913	Germany	... *Calculation of Diving Speeds.* (E. Kennel, Luftwissen, Vol. 10, No. 2, Feb., 1943, pp. 51-52.)
255	10143	G.B. ...	... *Performance Tests on the Junkers 88 A-6.* (Aeronautics, Vol. 8, No. 2, March, 1943, pp. 52-53.)
256	10340	U.S.A.	... *Factors Controlling Aircraft Design and Combat Performance.* (N. F. Silsbee, Aviation, Vol. 41, No. 11, Nov., 1942, pp. 96-99 and 307-320.)
257	10425	U.S.A.	... *Flight Performance Recorded Automatically in Ground Station. (Cut by Censor.)* (Autom. Ind., Vol. 88, No. 1, 1/1/43, p. 38.)
258	10596	Canada	... *Dead Reckoning Navigation.* (E. L. Collins, Flying, Vol. 32, No. 5, May, 1943, pp. 60-66 and 132.)
			Equipment, including Controls.
259	9807	Canada	... *New Fluorescent Lamp Ballast for Lighting of Aircraft Instruments.* (Canadian Aviation, Vol. 16, No. 1, Jan., 1943, p. 100.)
260	9879	U.S.A.	... *New Simplified Brake Valve.* (Am. Av., Vol. 6, No. 16, 15/1/43, p. 47.)
261	9882	U.S.A.	... *New Dust-Tight Relay for Aircraft.* (Am. Av., Vol. 6, No. 16, 15/1/43, p. 47.)
262	9970	U.S.A.	... *Bevel Gears in Aircraft.* (A. H. Candee, A.S.M.E., Preprint, Oct. Meeting, 1942.)
263	9975	U.S.A.	... *Portable Steel Runways.* (Am. Av., Vol. 6, No. 20, 15/3/43, p. 24.)
264	9980	U.S.A.	... *Bird-Proof Windshields.* (Am. Av., Vol. 6, No. 20, 15/3/43, p. 54.)
265	10002	U.S.A.	... *Windshield Protects Pilots from Birds.* (Autom. Ind., Vol. 88, No. 4, 15/2/43, p. 50.)
266	10015	U.S.A.	... *Crash-Proof Fuel Tanks.* (J. W. Baird, Preprint, National Aeron. Meeting of the S.A.E., March 12-13, 1942.)
267	10089	Germany	... *The Development of Electrical Equipment in Aircraft.* (E. Ruhlemann, Luftwissen, Vol. 10, No. 3, March, 1943, pp. 83-85.)
268	10146	G.B. ...	... *The Icing of Aircraft.* (Aeronautics, Vol. 8, No. 2, March, 1943, pp. 60-61.)
269	10156	G.B. ...	... *New Automatic Aircraft Control System (Sperry Patent).* (Aeronautics, Vol. 8, No. 2, March, 1943, p. 51.)
270	10259	U.S.A.	... *Electrical Protective Devices for Aircraft.* (J. C. Lebens, Aero Digest, Vol. 42, No. 3, March, 1943, pp. 229-231.)
271	10273	U.S.A.	... *New Windshield Glass, Safe Against Bird Crashes.* (Aero Digest, Vol. 42, No. 3, March, 1943, pp. 404-405.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
272	10335	Canada	... *Aircraft Fuel Tank Cap Assembly.* (Canadian Av., Vol. 15, No. 12, Dec., 1942, p. 144.)
			Airfields and Maintenance.
273	9801	Canada	... *New Airport Made on an Ontario Pasture (Photo).* (Canadian Aviation, Vol. 16, No. 1, Jan., 1943, p. 45.)
274	9824	U.S.A.	... *New Portable Hydraulic Aeroplane Lift.* (Autom. Ind., Vol. 88, No. 2, 15/1/43, p. 45.)
275	9846	U.S.A.	... *Plywood Hangar (Photo).* (Am. Av., Vol. 6, No. 11, 1/11/42, p. 48.)
276	9979	U.S.A.	... *Tyre Remover—New Device.* (Am. Av., Vol. 6, No. 20, 15/3/43, p. 49.)
277	10277	U.S.A.	... *Switches for Airport Runway Lighting.* (Aero Digest, Vol. 42, No. 3, March, 1943, pp. 432-434.)
278	10329	Canada	... *Maintenance of Plexiglas Sections on Aircraft.* (Canadian Av., Vol. 15, No. 12, Dec., 1942, pp. 116-117 and 122.)
279	10336	Canada	... *Extending Ladder for Servicing of Aircraft.* (Canadian Av., Vol. 15, No. 12, Dec., 1942, p. 148.)
280	10442	G.B. ...	... *Aerodrome Abstracts, Compiled by the Dept. of Scientific and Industrial Research, Abstracts Nos. 42-58.* (Vol. 2, No. 3, 1943.)
281	10489	G.B. ...	... *Land Drainage Machinery (I).* (Engineer, Vol. 175, No. 4,559, 28/5/42, pp. 420-421.)
			Airscrews and Helicopters.
282	9836	U.S.A.	... *New Propeller having Two Single Blades Revolving in Opposite Directions for Horizontal Lifting.* (G. W. Tidd, Am. Av., Vol. 6, No. 11, 1/11/42, p. 16.)
283	9871	U.S.A.	... *Increased Production of Hollow Steel Propeller Blade.* (Am. Av., Vol. 6, No. 17, 1/2/43, p. 51.)
284	9873	U.S.A.	... *Hamilton Counter-Rotating Propeller.* (Am. Av., Vol. 6, No. 17, 1/2/43, p. 52.)
285	9976	U.S.A.	... *Sikorsky Helicopter.* (Am. Av., Vol. 6, No. 20, 15/3/43, p. 24.)
286	9999	U.S.A.	... *V.D.M. Propeller Pitch Charging Mechanism.* (Autom. Ind., Vol. 88, No. 4, 15/2/42, pp. 40-41.)
287	10057	G.B. ...	... *Improvements in Marine Propeller Bossing Design.* (Mech. World, Vol. 113, No. 2,931, 5/3/43, p. 260.)
288	10085	Germany	... *Methods for Balancing Airscrews.* (H. Oschatz, Luftwissen, Vol. 10, No. 3, March, 1943, pp. 69-72.)
289	10086	Germany	... *The Coupling of Airscrew Blades in V.P. Mechanism.* (W. Nitzsche, Luftwissen, Vol. 10, No. 3, March, 1943, pp. 74-77.)
290	10354	U.S.A.	... *Co-Axial Electric Propeller (Developed by Curtiss-Wright).* (Aviation, Vol. 41, No. 11, Nov., 1942, p. 153.)
291	10378	U.S.A.	... *Special Propeller for Trainer Planes.* (Aviation, Vol. 41, No. 11, Nov., 1942, p. 261.)

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292	10422	U.S.A. ...	*Dual Rotation Propeller with Hydraulic Pitch Control (Six-Bladed) (Photograph).* (Autom. Ind., Vol. 88, No. 1, 1/1/43, p. 45.)
293	10558	U.S.A. ...	*New Counter Rotating Constant Speed Propeller.* (U.S. Air Services, Vol. 28, No. 2, Feb., 1943, p. 28.)
294	10602	Canada ...	*Two-Place Helicopter (XR-4) (Photo).* (Flying, Vol. 32, No. 5, May, 1943, p. 71.)

Engines and Accessories.

Named Types.

295	9818	G.B.	*Rolls Royce Merlin 61.* (M. W. Bourdon, Autom. Ind., Vol. 88, No. 2, 15/1/43, pp. 34-35 and 70.)
296	9827	Japan ...	*Japanese Engine Removed from Aircraft After Crashing (Photo).* (Am. Av., Vol. 6, No. 11, 1/11/42, p. 4.)
297	9981	U.S.A. ...	*Lycomings New Flat Geared Engine (Six-Cylinder, Horizontally Opposed Model of 210 h.p. (Photograph).* (Am. Av., Vol. 6, No. 20, 15/3/43, p. 58.)
298	10052	G.B.	*Diesel Marine Machinery, Harland and Wolff Engine. (Paper Presented to the Inst. of Mech. Engrs.).* (C. C. Pounder, Mech. World, Vol. 113, No. 2,931, 5/3/43, pp. 239-242.)
299	10087	Germany ...	*Aircraft Diesel Engine.* (Luftwissen, Vol. 10, No. 3, March, 1943, pp. 77-79.)
300	10088	Germany ...	*Historical Development of Siemens and B.M.W. Aircraft Engines.* (H. Lohner, Luftwissen, Vol. 10, No. 3, March, 1943, pp. 80-82.)
301	10098	G.B.	*Plastics in the Wright Cyclone Engine.* (Plastics, Vol. 7, No. 72, May, 1943, p. 213.)
302	10271	U.S.A. ...	*Lycomings New Six-Cylinder 210 h.p. Horizontally Opposed Engine.* (Aero Digest, Vol. 42, No. 3, March, 1943, p. 374.)
303	10371	Germany ...	*Design Details of B.M.W. 801 A Engine.* (M. V. Cave, Aviation, Vol. 41, No. 11, Nov., 1942, pp. 228-229 and 291-299.)
304	10399	U.S.A. ...	*A New Development in Two-Stroke Diesels (Sulzer).* (Antom. Ind., Vol. 88, No. 5, 1/3/43, pp. 30-31 and 47.)
305	10426	U.S.A. ...	*New Model Carburettor for Twin Wasp Engine.* (Autom. Ind., Vol. 88, No. 1, 1/1/43, p. 76.)
306	10563	U.S.A. ...	*Twin-Row 1,250 h.p. Pratt and Whitney "Wasps" (Photo).* (U.S. Air Services, Vol. 28, No. 2, Feb., 1943, p. 18.)
307	10566	Germany ...	*Development of the D.B. 601 Aero Engine.* (Motor Schau., Vol. 7, No. 2, Feb., 1943, pp. 58-60.)
308	10572	Germany ...	*The Development of the Diesel Engine.* (Motor Schau., Vol. 7, No. 3, March, 1943, pp. 105-107.)
309	10588	Canada ...	*The Allison Liquid-Cooled Engine.* (W. Levenor, Flying, Vol. 32, No. 5, May, 1943, pp. 28-31 and 84-92.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
			Design and Installation.
310	9780	U.S.A. ...	*Variable Thrust Line Engine* (*Photo*). (Autom. Ind., Vol. 87, No. 5, 1/9/42, p. 50.)
311	9822	U.S.A. ...	*Interchangeable Power Plants for British Bombers.* (M. W. Bourdon, Autom. Ind., Vol. 88, No. 2, 15/1/43, pp. 42-43.)
312	10019	U.S.A. ...	*Co-Designing Aircraft Power Plants.* (H. Karcher, S.A.E. Preprint, Nat. Aeron. Meeting, April 8-9, 1943.)
313	10020	U.S.A. ...	*General Aspects of Aircraft Power Plant Installation.* (T. Hammen, S.A.E. Preprint, Nat. Aeron. Meeting, April 8-9, 1943.)
314	10033	U.S.A. ...	*Harmonic Coefficients of Engine Torque Curves.* (F. Porter, J. App. Mech., Vol. 10, No. 1, March, 1943, pp. 38-48.)
315	10263	U.S.A. ...	*Diesel Auxiliary Power Unit for Large Aircraft.* (E. M. Wilson, Aero Digest, Vol. 42, No. 3, March, 1943, pp. 244-251.)
316	10268	U.S.A. ...	*An Evaluation of Engine Types.* (E. M. Lester, Aero Digest, Vol. 42, No. 3, March, 1943, pp. 364, 374, 417-424.)
317	10355	U.S.A. ...	*Wright Uses Plastic Engine Parts to Save Aluminium.* (Aviation, Vol. 41, No. 11, Nov., 1942, p. 53.)
318	10526	G.B.	*Hydraulically Operated Clutches.* (R. Waring-Brown, Mech. World, Vol. 113, No. 2,940, 7/5/43, pp. 489-491 and 499.)
319	10567	Germany ...	*Model Aircraft Petrol Engine.* (A. Thusius, Motor Schau., Vol. 7, No. 2, Feb., 1943, pp. 61-64.)
			Testing and Efficiency.
320	9783	U.S.A. ...	*Fundamentals of Good Carburization.* (Metal Progress, Vol. 42, No. 5, Nov., 1942, pp. 849-855.)
321	9845	U.S.A. ...	*Wright Co. Conducts Cold Weather Engine Tests.* (Am. Av., Vol. 6, No. 11, 1/11/42, p. 48.)
322	9901	U.S.A. ...	*Volumetric Efficiency for I.C. Engines.* (P. H. Schweitzer, Autom. Eng., Vol. 33, No. 434, March, 1942, pp. 107-108.)
323	9909	Germany ...	*Measures for Ensuring the Reliability of Aircraft Engines.* (H. Konba, Luftwissen, Vol. 10, No. 2, Feb., 1943, pp. 38-42.)
324	9911	Germany ...	*Measurement of Piston Temperature Under Load.* (W. Glaser, Luftwissen, Vol. 10, No. 2, Feb., 1943, pp. 44-49.)
325	9972	U.S.A. ...	*On the Definition of Volumetric Efficiency.* (P. H. Schweitzer, A.S.M.E. Preprint, Nov. Meeting, 1942.)
326	10298	Canada ...	*Engines and Altitudes.* (R. Sydney, Flying, Vol. 32, No. 3, March, 1943, pp. 30-32 and 80-82.)
327	10319	U.S.A. ...	*Sub-Zero Test Cell for Engine Tests.* (Flying, Vol. 32, No. 3, March, 1943, p. 94.)
328	10430	G.B.	*The Conditioning of Bearing Surfaces.* (H. Higinbotham, Mech. World, Vol. 113, No. 2,941, 14/5/43, pp. 535-537.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
			Drives, Piston Rings, etc.
329	9855	G.B. ...	... *Electrical Indicator Drives—Methods of Synchronizing Cathode Ray Oscillograph Engine Indicators.* (J. G. G. Hempson, Airc. Eng., Vol. 17, No. 170, April, 1943, pp. 98-99.)
330	10016	U.S.A.	... *Piston Rings and Oil Control in Two-Cycle High Output Diesel Engines.* (F. G. Shoemaker and R. Allbright, A.S.M.E. Preprint, Oil and Gas Power Conference, June 17-19, 1942.)
331	10017	U.S.A.	... *Solutions for Diesel Piston Problems.* (F. Zollner, A.S.M.E. Preprint, Oil and Gas Power Conference.)
332	10018	U.S.A.	... *Intake Systems for Aircraft Engines.* (C. T. Doman, S.A.E. Preprint, Nat. Aeron. Meeting, April 8-9, 1943.)
333	10058	G.B. ...	... *General Requirements of A.C. Motor Starters.* (Mech. World, Vol. 113, No. 2,931, 5/3/43, pp. 256-259.)
334	10094	G.B. ...	... *New Plastic Cylinder for Servo Unit.* (Plastics, Vol. 7, No. 72, May, 1943, pp. 194-195.)
335	10097	G.B. ...	... *Ultra-Centrifuge with Plastic Rotor.* (Plastics, Vol. 7, No. 72, May, 1942, pp. 212-213.)
336	10025	U.S.A.	... *Cooling Characteristics of Steel and Aluminium Finned Cylinders for In-Line Air-Cooled Engines.* (M. Piry, S.A.E. Preprint, Nat. Aeron. Meeting, April 8-9, 1943.)
337	10369	U.S.A.	... *Piston Rings in Aircraft Engine Maintenance.* (P. S. Lane, Aviation, Vol. 41, No. 11, Nov., 1942, pp. 205-207 and 339.)
338	10400	U.S.A.	... *Electronic Variable Speed Drive.* (S. D. Fendley, Autom. Ind., Vol. 88, No. 5, 1/3/43, pp. 32-33 and 51.)
339	10540	G.B. ...	... *Carburettor Air Scoops.* (F. C. Mock, Airc. Eng., Vol. 15, No. 171, May, 1943, pp. 135-143.)
			Bearings.
340	10385	G.B. ...	... *Fixing Bearings.* (Metal Industry, Vol. 62, No. 21, 21/5/43, p. 324.)
341	10450	G.B. ...	... *Ball and Roller Bearings (Collection of Abstracts on (1) Design and Applications, (2) Materials and Production, (3) Friction and Lubrication).* (I.A.E. Reports, No. 11, Nov., 1942.)
342	10549	G.B. ...	... *Roller Bearings.* (Trade and Engineering Times, Vol. 52, No. 95, April, 1943, p. 30.)
			Turbines, Pumps, Boilers.
343	9823	U.S.A.	... *Hamilton-Whitfield Blower.* (Autom. Ind., Vol. 88, No. 2, 15/1/43, pp. 44 and 82.)
344	9849	G.B. ...	... *The Internal Combustion Turbine.* (C. C. Pounder, Vol. 113, No. 2,936, 9/4/43, p. 379.)
345	9966	G.B. ...	... *Large Forced Circulation Boiler (Contd.).* (Engineer, Vol. 175, No. 4,556, 7/5/43, pp. 377-378.)
346	10045	G.B. ...	.. *The Boiler Water Treatment.* (Mech. World, Vol. 113, No. 2,934, 26/3/42, p. 327.)

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347	10049	G.B.	*The Power Station Boiler House.* (Mech. World, Vol. 113, No. 2,934, 26/3/43, pp. 322-324.)
348	10051	G.B.	*The Howden-Johnson Boiler. (Paper Presented to the Inst. of Mech. Engs.).* (C. C. Pounder, Mech. World, Vol. 113, No. 2,934, 26/3/43, pp. 340-341.)
349	10513	G.B.	*Pump for High Temperature Liquids.* (Engineer, Vol. 175, No. 4,558, 21/5/43, p. 414.)
350	10527	G.B.	*Compressed Air Venturi Ejectors and Blowers.* (P. J. Finn, Mech. World, Vol. 113, No. 2,940, 7/5/43, pp. 494-496.)
351	10574	U.S.A. ...	*Hydraulic Turbine Practice of the Tennessee Valley Authority.* (H. J. Petersen and J. F. Roberts, Mech. Eng., Vol. 65, No. 4, April, 1943, pp. 237-244.)
352	10582	U.S.A. ...	*Gas Turbine Locomotive with Electrical Transmission.* (P. R. Sidler, Mech. Eng., Vol. 65, No. 4, April, 1943, pp. 261-266.)
			Fuels and Lubricants.
			Fuels—General.
353	9902	G.B.	*Unifying Road Transport (Use of Indigenous Fuels).* (C. Ridley, Autom. Eng., Vol. 33, No. 434, March, 1942, pp. 109-114.)
354	10013	G.B.	*Fuel Research Intelligence Section. (Issued by Fuel Research Station, E. Greenwich.)* (Summary for two weeks ending 13 and 20 March, 1943.)
355	10053	G.B.	*Utilisation of Waste Fuels.* (Mech. World, Vol. 113, No. 2,931, 5/3/43, p. 242.)
356	10289	G.B.	*World Production of Petroleum and its Substitutes —Rough Estimates for 1942.* (The Petroleum Times, Vol. 47, No. 1,194, 1/5/43, p. 210.)
357	10435	G.B.	*Fuel Research Intelligence Section Abstracts (10 and 17 April, 1943.)*
358	10436	G.B.	*Fuel Research Intelligence Section Abstracts (24 April and 1 May, 1943).*
359	10594	Canada ...	*Airline Fuel Consumption.* (M. G. Beard, Flying, Vol. 32, No. 5, May, 1943, pp. 56-58 and 120-124.)
			Gaseous Fuels.
360	9863	G.B.	*Substitution of Acetylene by Propane or Coal Gas.* (Airc. Eng., Vol. 15, No. 170, April, 1943, p. 122.)
361	9907	G.B.	*Producer Gas for Motor Transport.* (Autom. Eng., Vol. 33, No. 434, March, 1942, p. 128.)
362	9971	U.S.A. ...	*Research Programme of the Institute of Gas Technology.* (H. Vogtborg, A.S.M.E. Preprint, Oct. Meeting, 1942.)
363	9985	G.B.	*Producer Gas v. Petrol Operation in Germany.* (Petroleum Times, Vol. 47, No. 1,193, 17/4/43, p. 190.)

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364	10005	U.S.A. ...	*Improved Process for Making Neohexane.* (Autom. Ind., Vol. 88, No. 4, 15/2/43, p. 58.)
365	10407	G.B.	*Removal of Sulphur from Gaseous Fuels for Heating Ferrous Metals.* (A. Preece, Engineering, Vol. 155, No. 4,036, 21/5/43, pp. 405-406.)
366	10429	G.B.	*Practical Gas Carburising.* (Mech. World, Vol. 113, No. 2,941, 14/5/43, pp. 524-526.)
			Catalytic Processes, etc.
367	9874	U.S.A. ...	*Houdry Process for Super Aviation Fuel.* (Am. Av., Vol. 6, No. 17, 1/2/43, p. 54.)
368	10006	U.S.A. ...	*New Catalytic Process for Super Aviation Fuel (Houdry Process).* (Autom. Ind., Vol. 88, No. 4, 15/2/43, pp. 58-59.)
369	10233	U.S.A. ...	*Fluid Catalytic Cracking Plant (Photo).* (Ind. Eng. and Chem. (News Ed.), Vol. 21, No. 5, March 10, 1943, p. 307.)
			Coal, Lignite.
370	10043	G.B.	*The Storage of Coal for Industrial Purposes. (Paper issued by the Ministry of Fuel.)* (R. A. A. Taylor, Mech. World, Vol. 113, No. 2,934, 26/3/43, pp. 317-320.)
371	10228	G.B.	*Coal Utilisation Research.* (Engineer, Vol. 175, No. 4,557, 14/5/43, pp. 386-389.)
372	10477	U.S.A. ...	*Lignite—Influence of Storage Conditions upon Size Degradation, Size Stability, and Friability.* (C. J. Eckhardt, A.S.M.E. Preprint, April 26 and 28, 1943.)
373	10585	U.S.A. ...	*Mixtures of Oil and Coal in Boiler Furnaces (Shortage of Fuel Oil).* (J. Blizard, Mech. Eng., Vol. 65, No. 4, April, 1943, pp. 278-284.)
			Oils and Lubricants.
374	9899	G.B.	*Oil Engine Indicator (Based on Pre-Exhaust Gas Pressure).* (Autom. Eng., Vol. 33, No. 434, March, 1942, p. 103.)
375	9905	G.B.	*Oil Coolers.* (E. Steintz and F. J. Grose, Autom. Eng., Vol. 33, No. 434, March, 1943, pp. 121-122.)
376	10023	U.S.A. ...	*Aircraft Oil Systems—High Altitude Problems.* (H. E. Moerman, S.A.E. Preprint, Nat. Aeron. Meeting, April 8-9, 1943.)
377	10134	G.B.	*Insulating Oil for Cables.* (S. Beckinsale, J. Inst. Elect. Engs., Vol. 9, No. 13, Feb., 1943, p. 3.)
378	10135	G.B.	*Mineral Oils for Transformers and Switchgear.* (A. A. Pollit, J. Inst. Elect. Engs., Vol. 9, No. 13, Feb., 1943, pp. 15-22.)
379	10136	G.B.	*Insulating Oil in Relation to Circuit-Breaker Failures.* (W. Fordham Cooper, J. Inst. Elect. Engs., Vol. 9, No. 13, Feb., 1943, pp. 23-28.)
380	10137	G.B.	*Maintenance of Insulating Oils in the Field.* (L. H. Welch, J. Inst. Elect. Engs., Vol. 9, No. 13, Feb., 1943, pp. 29-34.)

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381	10138	G.B.	*The Manufacture and Testing of Oils and Oil-Resin Saturants for Use in Electrical Equipment.* (A. W. Thompson and J. C. Wood-Mallock, Vol. 9, No. 13, Feb., 1942, pp. 35-53.)
382	10139	G.B.	*Discussion on Symposium of Papers on "Insulating Oils."* (J. Inst. Elect. Engs., Vol. 9, No. 13, Feb., 1943, pp. 53-64.)
383	10234	France ...	*Oil Discovery at Saint Gaudens.* (Ind. Eng. and Chem. (News Ed.), Vol. 21, No. 5, March 10, 1943, p. 319.)
384	10285	U.S.A. ...	*Oxidation—Corrosion of Lubricating Oils.* (C. L. Pope and D. A. Hall, A.S.T.M. Bulletin, No. 121, March, 1943, pp. 29-32.)
385	10288	Germany ...	*Recent Views on the German Oil Position.* (The Petroleum Times, Vol. 47, No. 1,194, 1/5/43, pp. 203-204.)
386	10397	U.S.A. ...	*Refining of Used Crankcase Oil.* (Autom. Ind., Vol. 88, No. 5, 1/3/43, pp. 24 and 48.)
387	10452	G.B.	*The Measurement of Aeration (Oils).* (H. R. Mills and W. Michalski, I.A.E. Reports, No. 1,943-1,947, 24/3/43, pp. 3-20.)

Theory of Elasticity

(Stresses, Fatigue Strength, Vibration Resistance of Materials).

388	9912	Germany ...	*Stress Increases in Hollow Thin-Walled Section Under Torsion.* (A. Weigand, Luftwissen, Vol. 10, No. 2, Feb., 1943, pp. 49-50.)
389	9969	U.S.A. ...	*Behaviour of Plywood Under Repeated Stresses.* (A. G. H. Dietz and H. Grinsfelder, A.S.M.E. Preprint, Oct. Meeting, 1942.)
390	9997	U.S.A. ...	*Fatigue of Metals as Influenced by Design and Internal Stresses.* (J. O. Almen, Autom. Ind., Vol. 88, No. 4, 15/2/43, pp. 28-31 and 88.)
391	10021	U.S.A. ...	*Improving the Fatigue Strength of Engine Parts.* (J. O. Almen, S.A.E. Preprint, Nat. Aeron. Meeting, April 8-9, 1943.)
392	10024	U.S.A. ...	*Effect of Openings in Moulded Plywood Structures.* (L. J. Marhoefer, S.A.E. Preprint, Nat. Aeron. Meeting, April 8-9, 1943.)
393	10030	U.S.A. ...	*The Distribution of Strains in the Rolling Process.* (C. W. Macgreggor, J. App. Mech., Vol. 10, No. 1, March, 1943, pp. 13-20.)
394	10032	U.S.A. ...	*Oscillations of Suspension Bridges.* (H. Reissner, J. App. Mech., Vol. 10, No. 1, March, 1943, pp. 23-32.)
395	10202	Germany ...	*Natural Frequencies of Torsional Systems, including Elastically Mounted Epicyclic Gearing.* (W. Benz, L.F.F., Vol. 20, No. 2, 27/2/43, pp. 46-47.)
396	10205	Germany ...	*The Drawing of Tough Materials Through Convergent Conical Dies.* (T. Poschl, Ing. Archiv., Vol. 13, No. 6, 1943, pp. 342-354.)
397	10206	Germany ...	*The Bending Deflection of a Circular Plate Under Eccentric Loads.* (W. Muller, Ing. Archiv., Vol. 13, No. 6, 1943, pp. 355-376.)

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398	10207	Germany ...	*The Evaluation of Two Definite Integrals Required in Elastic Plate Theory.* (H. R. Weber, Ing. Archiv., Vol. 13, No. 6, 1943, pp. 377-380.)
399	10208	Germany ...	*Theory of the Closed Circular Spring.* (R. Sonntag, Ing. Archiv., Vol. 13, No. 6, 1943, pp. 380-397.)
403	10284	U.S.A. ...	*Computation of "Dynamic Modulus."* (S. Walker, A.S.T.M. Bulletin, No. 121, March, 1943, pp. 23-24.)
404	10480	U.S.A. ...	*The Strength of Cylindrical Dies.* (G. Sachs and J. D. Lubahn, A.S.M.E. Preprint, Paper to be presented at June Meeting, 16 and 18 June, 1943.)
405	10490	G.B.	*Welding Contraction and Locked-up Stresses.* (Engineer, Vol. 175, No. 4,559, 28/5/43, pp. 423-425.)
406	10501	U.S.A. ...	*Accelerated Creep Research Using Wire Specimen.* (Sci. Am., Vol. 168, No. 3, March, 1943, p. 126.)
407	10541	G.B.	*The Vibration Resistance of Engineering Materials.* (W. L. Hatfield and others, Airc. Eng., Vol. 15, No. 171, May, 1943, p. 144.)
			Materials.
			A. Properties.
			General Properties of Some Materials.
409	10034	U.S.A. ...	*Plastic Flow as an Unstable Process (Discussion).* (L. H. Donnell, J. App. Mechs., Vol. 10, No. 1, March, 1943, pp. 49-51.)
410	10092	G.B.	*Substitute Materials in War and Peace. (Published by the Royal Inst. of Internat. Affairs.)* (C. H. Desch, Plastics, Vol. 7, No. 72, May, 1943, pp. 188-208.)
411	10111	G.B.	*The Corrosion and Fouling of Ships (Contd.).* (C. Bengough and V. Shepheard, Engineering, Vol. 155, No. 4,034, 7/5/43, pp. 363-364 and 378-380.)
412	10170	G.B.	*Industrial Metal Finishing. I. Aspects of the Corrosion of Metals and Alloys.* (H. Silman, Sheet Metal Industry, Vol. 17, No. 193, May, 1943, p. 836.)
413	10189	U.S.A. ...	*Pigment Dispersion with Surface-Active Agents.* (E. K. Fisher and C. W. Jerome, Ind. and Eng. Chem., Vol. 35, No. 3, March, 1943, pp. 336-343.)
414	10190	U.S.A. ...	*Preventing Internal Corrosion of Pipe Lines.* (A. Wachter and S. S. Smith, Ind. and Eng. Chem., Vol. 35, No. 3, March, 1943, p. 358.)
415	10197	G.B.	*Inverse Segregation—A Study of Alloys of Wide Solidification Range.* (M. L. Samuels and others, Metal Industry, Vol. 62, No. 20, 14/5/42, pp. 311-313.)
416	10241	G.B.	*The Corrosion and Fouling of Ships (Contd.).* (Engineering, Vol. 155. No. 4,035, 14/5/43, p. 394.)
417	10388	G.B.	*Inverse Segregation (Contd.).* (M. L. Samuels and others, Metal Industry, Vol. 62, No. 21, 21/5/42, pp. 328-330.)

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418	10391	Germany	...	*The Behaviour of Certain Structural Materials in the Tropics.* (A.T.Z., Vol. 44, No. 12, 25/6/41, pp. 316-317.) (R.T.P. Translation.)
419	10409	G.B.	...	*The Corrosion and Fouling of Ships.* (G. D. Bengough and V. G. Shepheard, Vol. 155, No. 4,036, pp. 416-417.)
420	10488	G.B.	...	*Plasticity of Cold Metals.* (Metal Industry, Vol. 62, No. 22, 28/5/43, p. 348.)
421	10515	G.B.	...	*Marine Corrosion.* (Engineer, Vol. 175, No. 4,558, 21/5/43, pp. 415-416.)
422	10520	G.B.	...	*Frictional Properties of Metallic Films.* (T. P. Hughes, Nature, Vol. 151, No. 3,836, 8/5/43, pp. 533-534.)
423	10528	G.B.	...	*Crystal Structure and Wear-Resisting Properties of Metals.* (Mech. World, Vol. 113, No. 2,940, 7/5/43, pp. 498-499.)
424	10542	G.B.	...	*Combined Raw Materials Board (First An. Report).* (Airc. Eng., Vol. 15, No. 171, May, 1943, pp. 143-148.)
				Iron and Steel.
425	9786	U.S.A.	...	*Brittleness in High Chromium Irons.* (Metal Progress, Vol. 42, No. 5, Nov., 1942, pp. 860-966.)
426	9789	U.S.A.	...	*Separation of High Speed Steels by Spark Testing.* (Metal Progress, Vol. 42, No. 5, Nov., 1942, p. 868.)
427	9792	U.S.A.	...	*Weldability of Steels.* (Metal Progress, Vol. 42, No. 5, Nov., 1942, pp. 885-886.)
428	9794	U.S.A.	...	*Machinability of Steels.* (Metal Progress, Vol. 42, No. 5, Nov., 1942, pp. 888-889 and 922.)
429	9852	G.B.	...	*Properties of High Duty Cast Irons.* (C. S. Darling, Mech. World, Vol. 113, No. 2,936, 9/4/43, pp. 393-396.)
430	10046	G.B.	...	*Molybdenum Ore Dressing (Flow Sheet No. 11).* (Mech. World, Vol. 113, No. 2,934, 26/3/42, pp. 329-330.)
431	10048	G.B.	...	*Applications of the New Cast Irons.* (C. S. Darling, Vol. 113, No. 2,934, 26/3/43, pp. 334-337.)
432	10140	G.B.	...	*Some Electrical Supply Aspects of Ferro-Alloy Manufacture.* (H. A. Sieveking, J. Inst. Elect. Engs., Vol. 9, No. 13, Feb., 1943, pp. 65-72.)
433	10240	G.B.	...	*The Microstructure of Lead-Bearing Steels.* (Engineering, Vol. 155, No. 4,035, p. 388.)
434	10481	G.B.	...	*References, Excluding Patents, to Iron-Vanadium and Iron-Titanium Alloys, 1929-1942.* (Science Library, Bibliographical Series, No. 586, 27/2/43.)
435	10482	G.B.	...	*Effect of Iron on Brass.* (Science Library, Bibliographical Series, No. 588, 10/3/43.)
436	10506	G.B.	...	*The Iron and Steel Institute—Annual Meeting and Proceedings.* (Engineer, Vol. 175, No. 4,558, 21/5/43, pp. 404-405.)
				Al. and Mg. Alloys.
437	9825	U.S.A.	...	*Flux for Gas Welding of Magnesium Alloys.* (Autom. Ind., Vol. 88, No. 2, 15/1/43, p. 46.)

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438	9959	G.B.	*Aluminium—Post War.* (Metal Industry, Vol. 62, No. 19, 7/5/43, p. 294.)
439	10001	U.S.A. ...	*New Manganese Alloy.* (Autom. Ind., Vol. 88, No. 4, 15/2/43, p. 46.)
440	10054	G.B.	*Magnesium—Present-Day Processes of Extraction.* (C. H. Desch, Mech. World, Vol. 113, No. 2,931, 5/3/43, pp. 243-246.)
441	10057	G.B.	*Melting Aluminium Borings and Turnings.* (Mech. World, Vol. 113, No. 2,931, 5/3/43, p. 255.)
442	10100	G.B.	*Joining Light Alloys with Adhesives (Redux Process).* (Plastics, Vol. 7, No. 72, May, 1943, pp. 216-218.)
443	10126	G.B.	*Drilling Deep Holes in Magnesium Alloys.* (W. W. Gilbert and A. M. Lennie, Machinery, Vol. 62, No. 1,593, 22/4/43, pp. 437-440.)
444	10195	G.B.	*Forging Aluminium Alloys.* (Metal Industry, Vol. 62, No. 20, 14/5/43, p. 308.)
445	10200	Germany ...	*Possibility of Reducing the Electrical Contact Resistance of Al. and Al. Alloys.* (C. Wagner and V. Stern, L.F.F., Vol. 20, No. 2, 27/2/43, pp. 33-41.)
446	10287	U.S.A. ...	*Annotated Bibliography of Aluminium Cleaning.* (J. Harris and R. B. Mears, A.S.T.M. Bulletin, No. 121, March, 1943, pp. 33-38.)
447	10389	G.B.	*Drilling Magnesium Alloys.* (W. W. Gilbert and A. M. Lennie, Metal Industry, Vol. 62, No. 21, 21/5/43, pp. 331-332.)
448	10485	G.B.	*Induction Furnaces for Melting Al. Alloys.* (M. Tama, Metal Industry, Vol. 62, No. 22, 28/5/43, pp. 341-342.)
			Non-Ferrous Metals.
449	9784	U.S.A. ...	*Supply and Demand for Copper.* (Metal Progress, Vol. 42, No. 5, Nov., 1942, pp. 874-876.)
450	9791	U.S.A. ...	*Oxidation of Copper.* (Metal Progress, Vol. 42, No. 5, Nov., 1942, pp. 962-964.)
451	9795	U.S.A. ...	*New Alloying Method for Copper-Lead and Aluminium-Lead Alloys.* (F. N. Rhines, Metal Progress, Vol. 42, No. 5, Nov., 1942, p. 890.)
452	9796	U.S.A. ...	*Copper Alloys.* (Metal Progress, Vol. 42, No. 5, Nov., 1942, p. 890.)
453	9850	G.B.	*The Production of Double Curvature Aircraft Components—The Use of Zinc and Lead Alloy Punch and Die Sets.* (A. J. T. Eyles, Mech. World, Vol. 113, No. 2,936, 9/4/43, pp. 380-382.)
454	9933	U.S.A. ...	*The Present Status of Beryllium.* (L. L. Stott, Paper Presented by the S.A.W.E.)
455	9961	G.B.	*Precipitation in the Copper-Silver Alloys—II.* (Metal Industry, Vol. 62, No. 19, 7/5/43, p. 296.)
456	10531	Germany ...	*Explosive Properties of Copper Azide Cu $(N_3)_2$.* (A. Cirulis, Z.G.S.S., Vol. 38, No. 3, March, 1943, pp. 42-45.)
457	10546	G.B.	*Allied Nickel Supply Position.* (Trade and Engineering Times, Vol. 52, No. 95, April, 1943, p. 12.)

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			Plastics.
458	9977	U.S.A. ...	*New Plastics for Aircraft Parts.* (Am. Av., Vol. 6, No. 20, 15/3/43, p. 27.)
459	10038	U.S.A. ...	*Laminated Phenolic Bearings (Ryertex).* (K. T. MacGill, Modern Plastics, Vol. 20, No. 3, Nov., 1942, pp. 76 and 112-114.)
460	10041	U.S.A. ...	*Behaviour of Plastics Under Vibrations.* (B. J. Layan, Modern Plastics, Vol. 20, No. 3, Nov., 1942, pp. 83-88 and 136-144.)
461	10042	U.S.A. ...	*Plasticizers.* (J. M. De Bell, Vol. 20, No. 3, Nov., 1942, pp. 89 and 128.)
462	10093	G.B.	*Polyvinyl-Acetate Adhesives.* (E. E. Halls, Plastics, Vol. 7, No. 72, May, 1943, pp. 189-193.)
463	10095	Germany ...	*Plastic Bearings for Rolling Mills (from Kunstoffe).* (Plastics, Vol. 7, No. 72, May, 1943, pp. 196-200.)
464	10096	Germany ...	*The Scope of Plastics in Automobile Engineering.* (D. Warburton Brown, Plastics, Vol. 7, No. 72, May, 1943, pp. 201-208.)
465	10104	Germany ...	*Design and Lubrication of Plastic Bearings. (Fordestechn., Vol. 32, pp. 261-385.)* (Plastics, Vol. 7, No. 72, May, 1943, p. 209.)
466	10187	U.S.A. ...	*Destructive Distillation of Lignocellulose.* (R. Katzen and others, Ind. and Eng. Chem., Vol. 35, No. 3, March, 1943, pp. 302-305.)
467	10191	U.S.A. ...	*Colouring Material for Copolymer Vinyl Chloride-Acetate Compounds.* (F. G. Clark, Vol. 35, No. 3, March, 1943, pp. 368-374.)
468	10192	U.S.A. ...	*Creep and Creep Recovery in Plasticized Polyvinyl Chloride.* (H. Leaderman, Ind. and Eng. Chem., Vol. 35, No. 3, March, 1943, p. 374.)
469	10207	Germany ...	*Resinoid Bearings of the World's Largest Rolling Mill (from Kunstoffe, Aug., 1942).* (J. Arens, British Plastics, Vol. 14, No. 168, May, 1943, pp. 708-716.)
470	10210	G.B.	*Fluorescent Plastics for Night Flying.* (British Plastics, Vol. 14, No. 168, May, 1943, p. 718.)
471	10211	G.B.	*Use of Melamine Compounds in War.* (British Plastics, Vol. 14, No. 168, May, 1943, p. 722.)
472	10212	G.B.	*Education in the World of Plastics (Contd.).* (V. E. Yarsley, British Plastics, Vol. 14, No. 168, May, 1943, pp. 728-737.)
473	10215	G.B.	*Charts on Plastics.* (British Plastics, Vol. 14, No. 168, May, 1943, pp. 738-758.)
474	10231	U.S.A. ...	*New Adhesive Plastic Saves Crude Rubber.* (Ind. Eng. and Chem. (News Ed.), Vol. 21, No. 5, 10/3/43, p. 317.)
475	10337	Canada ...	*New Insulation Materials (Varnished Nylon, etc.).* (Canadian Av., Vol. 15, No. 12, Dec., 1942, p. 150.)
476	10441	G.B.	*Plastic Abstracts issued by Controller of Chemical Research.* (No. 43, March, 1943.)
477	10499	U.S.A. ...	*C.R. 39 Transparent Plastic of High Abrasion Resistance.* (Sci. Am., Vol. 168, No. 3, March, 1943, p. 124.)

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478	10555	G.B.	*Plastics—Uses for Surgery.* (Trade and Engineering Times, Vol. 52, No. 95, April, 1943, p. 44.)
479	10576	U.S.A. ...	*Advances in Plastics During* 1942. (G. M. Kline, Mech. Eng., Vol. 65, No. 4, April, 1943, pp. 245-247 and 260.)
			Rubber (Nat. and Syn.).
480	9984	G.B.	*Synthetic Rubber from Petroleum in Roumania.* (E. A. Bell, Petroleum Times, Vol. 47, No. 1,193, 17/4/43, p. 184.)
481	10040	U.S.A. ...	*Fabrication of Polystrene.* (H. E. Griffith, Vol. 20, No. 3, Nov., 1942, pp. 79 and 122.)
482	10068	U.S.A. ...	*Rubber Replacements.* (E. G. Kimmich, Mech. Eng., Vol. 65, No. 2, Feb., 1943, pp. 113-114.)
483	10107	Germany ...	*Coverings for Marine Cables.* (*Gummi-Zeitung, Vol. 54, p. 254.*) (Plastics, Vol. 7, No. 72, May, 1943, p. 210.)
484	10108	Germany ...	*Rubber Derivatives Considered as Plastics.* (*Kunstoffe, Vol. 11, p. 189.*) (Plastics, Vol. 7, No. 72, May, 1943, p. 211.)
485	10114	U.S.A. ...	*Determination of Total Sulphur in Rubber and Rubberlike Materials.* (La Verne E. Cheyney, Ind. and Eng. Chem (Anal. Ed.), Vol. 15, No. 3, 15/3/43, pp. 164-165.)
486	10188	U.S.A. ...	*Electrical Properties of Neoprene.* (F. L. Yerzley, Ind. and Eng. Chem., Vol. 35, No. 3, March, 1943, pp. 330-335.)
487	10230	U.S.A. ...	*"Kem Pol" Synthetic Rubber from Domestic Vegetable Oils.* (Ind. Eng. and Chem. (News Ed.), Vol. 21, No. 5, March 11, 1943, pp. 306-307.)
488	10416	G.B.	*Rheology of Rubber.* (Nature, Vol. 151, No. 3,837, 15/5/43, pp. 563-564.)
489	10577	U.S.A. ...	*Advances in Rubber During* 1942. (J. H. Dillon, Mech. Eng., Vol. 65, No. 4, April, 1943, pp. 248-250.)
			Glass, Concrete.
490	9839	U.S.A. ...	*Fiberglass Fabric is Inner Braid of New Ignition Cable.* (Am. Av., Vol. 6, No. 11, 1/11/42, p. 39.)
491	9903	U.S.A. ...	*Glass Gauges.* (Autom. Eng., Vol. 33, No. 434, March, 1942, p. 114.)
492	10131	G.B.	*The Art of Glass Polishing* (*Book Review*). (Nature, Vol. 151, No. ——, 24/4/43, p. 459.)
493	10214	G.B.	*Glass Plastics as Aircraft Structural Material.* (British Plastics, Vol. 14, No. 168, May, 1943, p. 737.)
494	10232	U.S.A. ...	*Pyrex Glass Developments.* (Ind. and Eng. Chem. (News Ed.), Vol. 21, No. 5, March 10, 1943, pp. 312-313.)
495	10286	U.S.A. ...	*Discussion of Paper on Effect of Size of Specimens in Studies of Durability of Concrete as Affected by Aggregates.* (A.S.T.M. Bulletin, No. 121, March, 1943, pp. 29-32.)

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496	10530	G.B.	*Fibrous Glass Electrical Insulation.* (A. M. Robertson, Mech. World, Vol. 113, No. 2,940, 7/5/43, pp. 507-509.)
497	10584	U.S.A. ...	*Glass for Precision Gauges.* (H. B. Hambleton, Mech. Eng., Vol. 65. No. 4, April, 1943, pp. 274-276.)
			Resins, Paper.
498	9992	U.S.A. ...	*Discussion of the Properties of Casein Glues as Related to the Fabrication of Aircraft.* (H. Oldham, Commercial Aviation, Vol. 4, No. 12, Dec., 1942, pp. 98-100.)
499	10099	G.B.	*Aircraft Parts of Resin-Impregnated Paper.* (H. W. Perry, Plastics, Vol. 7, No. 72, May, 1943, p. 214.)
500	10002	G.B.	*Resinoids and Other Plastics as Film Formers. (XVII—Peculiarities of Physical Properties of High Polymers.)* (B. J. Biajnikoff, Plastics, Vol. 7, No. 72, May, 1943, pp. 222-230.)
501	10105	Germany ...	*Impregnation of Textile Fabrics with Acrylic Resins. (Chemiker Ztg., Vol. 66, No. 3, p. 24, 1942.)* (Plastics, Vol. 7, No. 72, May, 1943, p. 210.)
502	10106	Germany ...	*Electrical Strength of Commercial Resin-Impregnated Papers and Fabric Laminates. (Kunstoffe Techn., Vol. 11, p. 252.)* (Plastics, Vol. 7, No. 72, May, 1943, p. 210.)
503	10213	G.B.	*Leather Fibres Treated with Synthetic Resins.* (British Plastics, Vol. 14, No. 168, May, 1943, p. 437.)
504	10225	G.B.	*The Redux Process (Synthetic Resin Adhesive).* (Engineer, Vol. 175, No. 4,557, 14/5/43, p. 395.)
505	10349	U.S.A. ...	*Fabricating Plant Parts from Paper.* (Aviation, Vol. 41, No. 11, Nov., 1942, p. 138.)
506	10529	G.B.	*Papiermache Aircraft Components (Pytram).* (Mech. World, Vol. 113, No. 2,940, 7/5/43, p. 503.)
			Plywood, Wood.
507	9870	U.S.A. ...	*U.S. Research in Aircraft Plywood.* (Am. Av., Vol. 6, No. 17, 1/2/43, p. 50.)
508	10009	U.S.A. ...	*The Use of Wood for Aircraft.* (Autom. Ind., Vol. 88, No. 4, 15/2/43, p. 27.)
509	10029	U.S.A. ...	*Delamination Tests of Plywood and a Proposed Specification.* (C. W. Muhlenbruch, A.S.M.E. Preprints, April 26-28, 1943.)
510	10066	U.S.A. ...	*Problems in the Use of Plywood in Aeroplane Construction.* (A. Klemin, Mech. Eng., Vol. 65, No. 2, Feb., 1943, pp. 105-109.)
511	10071	U.S.A. ...	*Plywood in Aircraft Construction.* (G. A. Allwood, Mech. Eng., Vol. 65, No. 1, Jan., 1943, pp. 14-16.)
512	10072	U.S.A. ...	*Making Plywood with Multi-Directional Pressure.* (J. S. Barnes, Mech. Eng., Vol. 65, No. 1, Jan., 1943, pp. 17-20.)

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513	10127	G.B.	*Determination of the Water Content of Wood and Other Substances by Means of Ternary Azeotropic Mixtures.* (Nature, Vol. 151, No. 3,833, 17/4/43, p. 449.)
514	10186	U.S.A. ...	*Partial Pyrolysis of Wood.* (R. W. Merritt and A. A. White, Ind. and Eng. Chem., Vol. 35, No. 3, March, 1943, pp. 297-301.)
515	10264	U.S.A. ...	*Douglas Fir Plywood for Aircraft.* (N. S. Perkins, Aero Digest, Vol. 42, No. 3, March, 1943, pp. 260 and 384-386.)
516	10299	Canada ...	*Setting Glue by High Frequency Currents (for Wooden Spars).* (G. R. Reiss, Flying, Vol. 32, No. 3, March, 1943, pp. 33-34 and 147.)
517	10510	G.B.	*Wood and Steel.* (Engineer, Vol. 175, No. 4,558, 21/5/43, pp. 410-411.)
518	10511	U.S.A. ...	*Wood in Aircraft Construction (from the A.S.M.E., Dec., 1942).* (R. J. Nebesar, Engineer, Vol. 175, No. 4,558, 21/5/43, pp. 412-413.)
			Temp. Indicating Lacquers and Crayons.
519	9864	G.B.	*Temperature Indicating Crayons.* (Airc. Eng., Vol. 15, No. 70, April, 1943, p. 122.)
520	10504	U.S.A. ...	*Temperature Recording Lacquer (Sharp Melting Point).* (Sci. Am., Vol. 168, No. 3, March, 1943, p. 132.)
			B. Fabrication.
			Heat Treatment.
521	9787	U.S.A. ...	*Automatic Units for Heat Treating High Explosive Shells.* (Metal Progress, Vol. 42, No. 5, Nov., 1942, pp. 861-866.)
522	9797	U.S.A. ...	*Proper Heat Treatment of Tool Steels.* (Metal Progress, Vol. 42, No. 5, Nov., 1942, pp. 896-898.)
523	10069	U.S.A. ...	*Analyzing Heat Flow in Cyclic Furnace Operation.* (C. B. Bradley and C. E. Ernst, Mech. Eng., Vol. 65, No. 2, Feb., 1943, pp. 125-129.)
524	10118	G.B.	*Hard Surfacing of Metals.* (Mech. World, Vol. 113, No. 2,938, 23/4/43, pp. 437-438.)
525	10486	G.B.	*Combustion Safeguards in Gas-Fired Furnaces.* (T. A. Cohen, Metal Industry, Vol. 62, No. 22, 28/5/43, pp. 343-344.)
526	10494	G.B.	*Development of the Hot Spraying of Powdered Materials.* (W. E. Ballard, Chemistry and Industry, Vol. 62, No. 21, May 22, 1943, pp. 190-194.)
527	10496	U.S.A. ...	*Induction Heating Applied to Steel Propeller Shanks.* (Sci. Am., Vol. 168, No. 3, March, 1943, p. 108.)
528	10498	U.S.A. ...	*Induction Hardening Applied to Engine Crankshafts.* (Sci. Am., Vol. 168, No. 3, March, 1943, pp. 123-124.)
			Plating and Protective Coatings.
529	9790	U.S.A. ...	*Surface Preparation for Spot Welding Aluminium.* (Metal Progress, Vol. 42, No. 5, Nov., 1942, pp. 912-913 and 929.)

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530	10103	Germany ...	*Protection of Zinc (from Techn. Zbl. Prakt. Mettalbearbeitung, Vol. 51, p. 583).* (Plastics, Vol. 7, No. 72, May, 1943, p. 209.)
531	10159	G.B.	*Deoxidation with Beryllium.* (Sheet Metal Industry, Vol. 17, No. 193, May, 1943, p. 876.)
532	10199	G.B.	*Anodising in Wartime.* (H. W. Wallbank, Metal Industry, Vol. 62, No. 20, 14/5/43, pp. 314-316.)
533	10237	G.B.	*Bibliography of Foreign Published Information on Protective Coatings* (1, *Protective Coatings—General; 2, Electrolytic Oxidation; 3, Cladding; 4, Phosphate and Chromate Layers; 5, Electroplating and Polishing; 6, Metal Spraying; 7, Painting).* (R.T.P.3, Bibliography No. 85, issued by the Ministry of Aircraft Production.)
534	10245	U.S.A. ...	*New Coatings Specifications Save Raw Materials.* (Ind. Eng. and Chem. (News Ed.), Vol. 21, No. 6, March, 1943, pp. 370-372.)
535	10282	U.S.A. ...	*Summary of Protective Coatings, Raw Materials Situation.* (A. C. Goetz, A.S.T.M., No. 121, March, 1943, pp. 15-18.)
536	10390	G.B.	*Plating and Finishing.* (Metal Industry, Vol. 62, No. 21, 21/5/43, p. 332.)
537	10487	G.B.	*Electrodeposition of Aluminium.* (B. D. Ostrow, Metal Industry, Vol. 62, No. 22, 28/5/43, pp. 346-348.)
			Welding (Heliarc, Gas, etc.).
538	9817	U.S.A. ...	*The Temprite Spot Welder Cooler.* (Autom. Ind., Vol. 88, No. 2, 15/1/43, p. 33.)
539	9853	G.B.	*Developments in Flat-Fillet Welding Technique.* (Mech. World, Vol. 113, No. 2,936, 9/4/43, p. 397.)
540	9862	G.B.	*Butt Welding of High Speed Steel.* (Airc. Eng., Vol. 15, No. 170, April, 1943, p. 122.)
541	9962	G.B.	*The Gas Welding of Copper.* (Metal Industry, Vol. 62, No. 19, 7/5/43, pp. 298-300.)
542	10047	G.B.	*Oxy-Butane Welding.* (Mech. World, Vol. 113, No. 2,934, 26/3/43, p. 333.)
543	10120	G.B.	*A Development in Welded Fabrication.* (Mech. World, Vol. 113, No. 2,938, 23/4/43, p. 441.)
544	10158	G.B.	*Bronze Welding.* (A. J. T. Eyles, Sheet Metal Industry, Vol. 17, No. 193, May, 1943, pp. 874-875.)
545	10161	G.B.	*Elin-Hafergut Welding Process.* (R. F. Tylecote, Sheet Metal Industry, Vol. 17, No. 193, May, 1943, pp. 878-879.)
546	10162	G.B.	*Conservation of Arc Welding Electrode.* (Sheet Metal Industry, Vol. 17, No. 193, May, 1943, p. 879.)
547	10163	Germany ...	*Automatic Arc Welding Without the Aid of Mechanical Appliances (Translation from the German).* (G. Hafergut, Sheet Metal Industry, Vol. 17, No. 193, May, 1943, pp. 880-882.)
548	10272	U.S.A. ...	*Electronic Control for Aluminium Welding.* (Aero Digest, Vol. 42, No. 3, March, 1943, pp. 432-434.)

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549	10275	U.S.A. ...	*New Method Speeds Up Maintenance on Gas Welding and Flame Cutting.* (Aero Digest, Vol. 42, No. 3, March, 1943, pp. 407-408.)
550	10334	Canada ...	*Gas Welding Flux in Glass Containers.* (Canadian Av., Vol. 15, No. 12, Dec., 1942, p. 140.)
551	10351	U.S.A. ...	*Heliarc Welding Opens New Horizons in Aircraft Design and Construction (Magnesium Welded Structures).* (Aviation, Vol. 41, No. 11, Nov., 1942, pp. 147 and 323-324.)
552	10395	U.S.A. ...	*Nitric-Hydrofluoric Bath for Removing Welding Flux from Aluminium Alloy Parts.* (P. M. Craig, Autom. Ind., Vol. 88, No. 5, 1/3/43, pp. 19 and 53.)
553	10427	U.S.A. ...	*The Sciaky Portable Gun Welder.* (Autom. Ind., Vol. 88, No. 1, 1/1/43, p. 84.)
554	10484	G.B.	*Welding with Al Bronze Welding Rods.* (D. E. Swift, Metal Industry, Vol. 62, No. 22, 28/5/43, p. 340.)
555	10512	U.S.A. ...	*Structural Failure of All-Welded Tanker "Schenectlady".* (Engineer, Vol. 175, No. 4,558, 21/5/43, pp. 413-414.)
556	10514	G.B.	*Air Operated Spot Welder.* (Engineer, Vol. 175, No. 4,558, 21/5/43, pp. 414-415.)
			Milling, Grinding, Machining, etc.
557	9925	G.B.	*Preventing Breakages of Milling Cutters.* (Machinery, Vol. 62, No. 1,588, 18/3/43, p. 293.)
558	9990	Canada ...	*High Speed Vertical Milling.* (Commercial Aviation, Vol. 4, No. 12, Dec., 1942, pp. 88-89.)
559	10123	G.B.	*Grinding and Inspection of Tool Steels.* (Machinery, Vol. 62, No. 1,593, 22/4/43, p. 428.)
560	10124	G.B.	*Machining with Coated Abrasives.* (Machinery, Vol. 62, No. 1,593, 22/4/43, p. 429.)
561	10164	G.B.	*Rolling, Processing and Testing of Tinplate—Pickling Practice (Contd.).* (W. E. Hoare and E. S. Hedges, Sheet Metal Industry, Vol. 17, No. 193, May, 1943, pp. 791-799.)
562	10165	G.B.	*Cold and Hot Rolling of Metals (Contd.).* (*R.T.P. Translation No.* 1,735.) (O. Enicke and K. H. Lucas, Sheet Metal Industry, Vol. 17, No. 193, May, 1943, pp. 800-804.)
563	10258	U.S.A. ...	*Free Machining 36 per cent. Nickel Alloy ("Invar").* (G. V. Luerssen, Aero Digest, Vol. 42, No. 3, March, 1943, pp. 229-231.)
564	10492	G.B.	*Surface Finish and Function of Parts (with Discussion).* (G. Schlessinger, Vol. 175, No. 4,559, 28/5/43, pp. 429-430 and 434-436.)
			Soldering and Brazing.
565	9785	U.S.A. ...	*Brazing—Data Sheet No.* 4. (Metal Progress, Vol. 42, No. 5, Nov., 1942, p. 823.)
566	9958	G.B.	*Tongs for Silver Brazing.* (Metal Industry, Vol. 62, No. 19, 7/5/43, p. 294.)

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567	10194	G.B. ...	... *Non-Corrosive Soldering Fluxes.* (H. Silman and W. Stein, Metal Industry, Vol. 62, No. 20, 14/5/43, pp. 306-308.)
568	10386	G.B. ...	... *Non-Corrosive Soldering Fluxes (Contd.).* (H. Silman and W. Stein, Metal Industry, Vol. 62, No. 21, 21/5/42, pp. 325-327.)
			Cutting and Cutting Tools.
569	9793	U.S.A.	... *Cutting of Steel and Cutting Tools.* (Metal Progress, Vol. 42, No. 5, Nov., 1942, pp. 887-888.)
570	9799	U.S.A.	... *Tool Bits for Cutting Hard Metals.* (Metal Progress, Vol. 42, No. 5, Nov., 1942, p. 946.)
571	10121	G.B. ...	... *Small Quantity Gear Cutting.* (Mech. World, Vol. 113, No. 2,938, 23/4/43, pp. 448-450.)
572	10160	G.B. ...	... *Machine Oxygen Cutting.* (Sheet Metal Industry. Vol. 17, No. 193, May, 1943, p. 877.)
573	10579	U.S.A.	... *Carbide Cutters v. High Speed Steel.* (H. A. Oldenkamp and J. McFadyn, Mech. Eng., Vol. 65, No. 4, April, 1943, pp. 253-256.)
574	10580	U.S.A.	... *Cutting Metals from the Users' Point of View.* (L. B. Dorsner, Mech. Eng., Vol. 65, No. 4, April, 1943, pp. 257-258.)
575	10581	U.S.A.	... *A Method of Meeting Cutting Tool Material Problems.* (H. A. Tobey, Mech. Eng., Vol. 65, No. 4, April, 1943, pp. 259-260.)
			Dies and Casting.
576	10350	U.S.A.	... *Fabricating Plastic Dies for Acrylate Sheets.* (K. L. Leeg, Aviation, Vol. 41, No. 11, Nov., 1942, pp. 143-145 and 336.)
577	10383	G.B. ...	... *Relative Characteristics of Non-Ferrous Casting Techniques.* (Metal Industry, Vol. 62, No. 21, 25/5/43, pp. 322-324.)
578	10396	U.S.A.	... *Some Recent Developments in Sheet Metal Fabrication (Dies, etc.).* (P. L. Smith and V. L. Brooks, Autom. Ind., Vol. 88, No. 5, 1/3/43, pp. 22-23 and 53.)
			Moulding.
579	10036	U.S.A.	... *Injection Moulded Thermosetting Parts.* (H. R. Morse, Modern Plastics, Vol. 20, No. 3, Nov., 1942, pp. 41-43 and 128-134.)
580	10037	U.S.A.	... *Moulding with Non-Critical Materials.* (C. P. Morgan, Modern Plastics, Vol. 20, No. 3, Nov., 1942, pp. 60-61.)
581	10039	U.S.A.	... *Cold Moulding Impact Material Preforms.* (Modern Plastics, Vol. 20, No. 3, Nov., 1942, pp. 78 and 118.)
			Etching, Drop Stamping.
582	10168	G.B. ...	... *Drop Stamping Practice.* (A. T. Pierce, Sheet Metal Industry, Vol. 17, No. 193, May, 1943, pp. 831-838.)
583	10169	G.B. ...	... *Etching on Metals—Details of New Method.* (Sheet Metal Industry, Vol. 17, No. 193, May, 1943, p. 836.)

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584	10384	G.B. ...	... *Plastic Punches for Drop Stamping.* (Metal Industry, Vol. 162, No. 21, 21/5/43, p. 324.)
			Rivets and Riveting.
585	10245	U.S.A.	... *Super-Hard Rivets to Replace Bolts (Hi Shear Rivet).* (Ind. and Eng. Chem. (News Ed.), Vol. 21, No. 26, March, 1943, p. 424.)
586	10320	Canada	... *Electric Gun for Riveting.* (Flying, Vol. 32, No. 3, March, 1943, p. 94.)
			Spinning, Forge-Piercing.
587	9998	U.S.A.	... *Tube Spinning and Necking Operations Developed by the New Wolverine "Spun End Process."* (Autom. Ind., Vol. 88, No. 4, 15/2/43, p. 39.)
588	10056	G.B. ...	... *Accuracy in Forge Piercing.* (Mech. World, Vol. 113, No. 2,931, 5/3/43, p. 249.)
			Machines and Machine Tools.
589	9819	U.S.A.	... *The Holly Tube Bender.* (Autom. Ind., Vol. 88, No. 2, 15/1/43, p. 37.)
590	9924	G.B. ...	... *Tool Angles, Feeds, Speeds, etc., for Machining with Cemented Carbide Tools.* (Machinery, Vol. 62, No. 1,588, 18/3/43, p. 297.)
591	10044	G.B. ...	... *A New Carbide Tipped Tool.* (Mech. World, Vol. 113, No. 2,934, 26/3/42, pp. 323-324.)
592	10157	G.B. ...	... *The Development of Carbide Tipped Tools.* (Sheet Metal Industry, Vol. 17, No. 193, May, 1943, pp. 863-864.)
593	10226	G.B. ...	... *Magnetic Skimmer for Removing Ferrous Particles.* (Engineer, Vol. 175, No. 4,557, 14/5/43, p. 393.)
594	10270	U.S.A.	... *Rivet Sorting Machines.* (Aero Digest, Vol. 42, No. 3, March, 1943, pp. 370 and 406.)
595	10345	U.S.A.	... *Range of Drop Hammer Operations.* (C. J. Frey and S. S. Kogut, Aviation, Vol. 41, No. 11, Nov., 1942, pp. 118-121 and 340.)
596	10365	U.S.A.	... *Power Presses (Die Cushion Size and Ring Holding Pressure Required).* (Aviation, Vol. 41, No. 11, Nov., 1942, pp. 161-163.)
597	10408	G.B. ...	... *Magnetic Skimmer for Swarf Removal.* (Engineering, Vol. 155, No. 4,036, 21/5/43, p. 406.)
598	10421	U.S.A.	... *North American New Boring Tool.* (Autom. Ind., Vol. 88, No. 1, 1/1/43, pp. 42 and 72.)
			C. Inspection.
			Testing, Crack Detection.
599	9851	G.B. ...	... *Testing Heat Insulating Materials at the N.P.L.* (Mech. World, Vol. 113, No. 2,936, 9/4/43, p. 382.)
600	10110	G.B. ...	... *Testing the Wall Thickness of Intricate Castings.* (B. M. Thornton, Engineering, Vol. 150, No. 4,034, 7/5/43, p. 361.)
601	10167	G.B. ...	... *The Testing of Continuity of Thin Tin Coatings on Steel.* (R. Kerr, Sheet Metal Industry, Vol. 17, No. 193, May, 1943, pp. 817-818 and 825.)

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602	10414	G.B.	*Crack Detection in Non-Ferrous Materials (Hyglo System).* (Nature, Vol. 151, No. 3,837, 15/5/43, p. 555.)
603	10483	G.B.	*Modern Methods of Metallurgical Analysis.* (E. A. Liddiard, Metal Industry, Vol. 62, No. 22, 28/5/43, pp. 338-340.)
604	10523	G.B.	*The Mechanical Testing of Materials with Special Reference to the Testing of Welds.* (V. E. Green, Engineering Inspection, Vol. 8, No. 1, Spring, 1943, pp. 24-28 and 36.)
605	10525	G.B.	*The Fabrication and Testing of Fusion Welded Pressure Vessels.* (S. H. Griffiths, Engineering Inspection, Vol. 8, No. 1, Spring, 1943, pp. 4-23.)
606	10544	G.B.	*Magnetic Crack Detection in Welded Structures.* (Airc. Eng., Vol. 15, No. 171, May, 1943, p. 152.)
607	10586	U.S.A. ...	*Chart Giving Various Systems for Designating Surface Roughness.* (Mech. Eng., Vol. 65, No. 4, April, 1943, p. 285.)
			X-Ray Analysis.
608	9923	G.B.	*The Use of Infra-Red Rays.* (Machinery, Vol. 62, No. 1,588, 18/3/43, p. 287.)
609	9927	G.B.	*Portable X-Ray Unit.* (Machinery, Vol. 62, No. 1,588, 18/3/43, p. 300.)
610	9956	G.B.	*X-Ray Crystal Analysis.* (Metal Industry, Vol. 62, No. 19, 7/5/43, pp. 290-292.)
611	10387	G.B.	*X-Ray Analysis in Industry (Symposium of Papers).* (Metal Industry, Vol. 62, No. 21, 21/5/43, p. 327.)
612	10392	G.B.	*X-Rays and Light Metallurgy (Book).* (E. J. Tunnicliffe, issued by Siemens-Schuckert, Ltd.) (Available in R.T.P.3, Ministry of Aircraft Production.)
613	10412	G.B.	*X-Ray Analysis.* (L. Bragg, Nature, Vol. 151, No. 3,837, 15/5/43, pp. 545-547.)
			Instruments.
			Flight.
614	10201	Germany ...	*Evaluation of Time Records by the Simultaneous Employment of Instruments of Different Types.* (H. Knoblock, L.F.F., Vol. 20, No. 2, 27/3/43, pp. 42-45.)
615	10352	U.S.A. ...	*Flight Recorder to Ease Test Pilot's Job.* (Aviation, Vol. 41, No. 11, Nov., 1942, p. 149.)
616	10372	U.S.A. ...	*Simplified Computors' Aid Navigation.* (P. V. H. Weems, Aviation, Vol. 41, No. 11, Nov., 1942, pp. 233-234.)
617	10595	Canada ...	*New Flight Test Recorder.* (L. C. Thomas, Flying, Vol. 32, No. 5, May, 1943, pp. 60-61, 169.)
			Electrical.
618	9858	Germany ...	*Electrical Measurement of Stresses.* (*R.T.P.3 Translation No.* 1,615.) (H. Theis, Airc. Eng., Vol. 15, No. 170, April, 1943, pp. 106-109.)

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619	10141	G.B.	*The Law of the Moving-Iron Instrument.* (G. F. Tagg, J. Inst. Elect. Engs., Vol. 9, No. 13, Feb., 1943, pp. 65-72.)
620	10142	G.B.	*Theory of the Force or Torque of Soft Iron Electrical Instruments.* (C. V. Drysdale, J. Inst. Elect. Engs., Vol. 9, No. 13, Feb., 1943, pp. 79-83.)
623	10502	U.S.A. ...	*Electric Extensometer.* (Sci. Am., Vol. 168, No. 3, March, 1943, p. 126.)
			Flow Meters.
624	10451	G.B.	*An Air Flowmeter for Rates of Flow.* (L. Rosenfield, I.A.E. Reports, No. 1,943-1,945, 24/3/43, p. 36.)
625	10505	U.S.A. ...	*Electric Fuel Flowmeter.* (Sci. Am., Vol. 168, No. 3, March, 1943, pp. 133-134.)
			Miscellaneous.
626	9861	G.B.	*Precision Instruments for Engineers.* (Aircr. Eng., Vol. 15, No. 170, April, 1943, pp. 120-121.)
627	9906	G.B.	*New British Precision Measuring Instruments.* (Autom. Eng., Vol. 33, No. 434, March, 1942, pp. 123-125.)
628	10000	U.S.A. ...	*New Apparatus for Vibration Studies.* (Autom. Ind., Vol. 88, No. 4, 15/2/43, pp. 44-45 and 90.)
629	10115	U.S.A. ...	*The Rolling Ball Viscometer.* (R. M. Hubbard and G. G. Brown, Ind. and Eng. Chem. (Anal. Ed.), Vol. 15, No. 3, 15/3/43, pp. 212-218.)
630	10406	G.B.	*Stroboscopic Equipment.* (G. Windred, Engineering, Vol. 155, No. 4,036, May 21, 1943, pp. 401-402.)
631	10431	U.S.A. ...	*Mass Spectrometer for Quantitive Analysis of Refinery Gases.* (Nat. Pet. News, Vol. 35, No. 12, 24/3/43, p. 14.)
			Production.
			Organisation and Control.
632	9860	G.B.	*Quality Control in Production Engineering.* (H. Rissik, Aircr. Eng., Vol. 15, No. 170, April, 1943, pp. 115-119 and 121.)
633	10064	U.S.A. ...	*War Production in 1943.* (L. R. Boulware, Mech. Eng., Vol. 65, No. 2, Feb., 1943, p. 99.)
634	10075	U.S.A. ...	*Organisation as a Project in Human Engineering.* (P. Pigors, Mech. Eng., Vol. 65, No. 1, Jan., 1943, pp. 40-41.)
635	10112	G.B.	*Plant Maintenance.* (Engineering, Vol. 155, No. 4,034, 7/5/43, p. 372.)
636	10116	G.B.	*Running Trials and Acceptance Tests in a New Factory.* (J. V. Brittain, Mech. World, Vol. 113, No. 2,938, 23/4/43, pp. 431-432.)
637	10119	G.B.	*Production Efficiency Reports.* (G. Lowe, Mech. World, Vol. 113, No. 2,738, 23/4/43, pp. 439-440.)

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638	10128	G.B.	...	*Control of Raw Materials.* (Nature, Vol. 151, No. 3,833, 17/4/43, pp. 452-453.)
639	10198	G.B.	...	*Production Control Booklet, issued by British Standards Inst., B.S.I.* 100, *Pt. I* (1943). (Metal Industry, Vol. 62, No. 20, 14/5/43, p. 313.)
640	10242	G.B.	...	*Post-War Reconstruction Employers' Need for Organisation.* (Engineering, Vol. 155, No. 4,035, 14/5/43, pp. 383-384.)
641	10257	U.S.A.	...	*Curtiss-Wright's Shop Priority Control System.* (W. J. Shepherd, Aero Digest, Vol. 42, No. 3, March, 1943, pp. 216-220 and 382.)
642	10267	Germany	...	*Directory of Aircraft Manufacturers.* (Aero Digest, Vol. 42, No. 3, March, 1943, pp. 283-362 and 424.)
643	10290	G.B.	...	*High Speed in the Wartime Production Shop.* (G. Schlesinger, J. Inst. Prod. Engs., Vol. 22, No. 4, April, 1943, pp. 137-167.)
644	10380	U.S.A.	...	*Sub-Contracting as a Permanent Policy.* (Aviation, Vol. 41, No. 11, Nov., 1942, pp. 189 and 336-339.)
645	10417	U.S.A.	...	*Quality Control at Bendix.* (J. Geschelin, Autom. Ind., Vol. 88, No. 1, 1/1/43, pp. 18-23 and 44.)
646	10419	U.S.A.	...	*Conservation of Critical Materials, Man-Hours v. Machine Time.* (Autom. Ind., Vol. 88, No. 1, 1/1/43, pp. 26-29 and 64.)
647	10524	G.B.	...	*A Brief Summary of Some Simple Methods of Quality Control.* (A. S. Wharton, Engineering Inspection, Vol. 8, No. 1, Spring, 1943, pp. 29-36.)
648	10543	G.B.	...	*Sampling Inspection and Quality Determination.* (H. Rissik, Aire. Eng., Vol. 15, No. 171, May, 1943, pp. 149-152.)
				Research and Training.
649	9805	Canada	...	*Training New Workers in the Aircraft Industry.* (E. W. Lloyd, Canadian Aviation, Vol. 16, No. 1, Jan., 1943, pp. 76-78.)
650	9820	U.S.A.	...	*Training Workers for High Precision Work at Adel Precision Products Corp.* (Autom. Ind., Vol. 88, No. 2, 15/1/43, pp. 30-31, 80 and 81.)
651	9965	G.B.	...	*University Education and Research in America.* (Engineer, Vol. 175, 4,550, 7/5/43, pp. 375-376.)
652	10063	U.S.A.	...	*The New Curtiss-Wright Research Laboratory (with Photographs of Altitude Chamber).* (Curtiss Flyleaf, Vol. 25, No. 4, Sept.-Oct., 1942, pp. 21-23.)
653	10070	U.S.A.	...	*Industrial Psychology—Industrial Relations.* (I. Knickerbocker, Mech. Eng., Vol. 65, No. 2, Feb., 1943, pp. 137-138.)
654	10077	U.S.A.	...	*Mobile Training Units Equipped by Curtiss to Train Aircraft Mechanics.* (S. Spaulding, Curtiss Flyleaf, Vol. 25, No. 5, Nov.-Dec., 1942, pp. 3-5.)
655	10223	G.B.	...	*Education and Training for Engineers.* (*Abstract of Memorandum Issued by the Institution of Electrical Engineers.*) (Engineer, Vol. 175, No. 4,557, 14/5/43, p. 389.)

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656	10413	India ...	*Science in India* (*Resources, etc.*). (D. N. Wadia, Nature, Vol. 151, No. 3,837, 15/5/43, pp. 548-551.)
657	10428	G.B.	*Practical Points on Training Welders.* (W. J. Thaw, Mech. World, Vol. 113, No. 2,941, 14/5/43, pp. 517-519.)
658	10517	G.B.	*Conservation of Scientific and Technical Periodicals.* (Nature, Vol. 151, No. 3,836, 8/5/43, pp. 512-513.)
659	10518	G.B.	*News and Views from the Scientific Front.* (R. Gregory, Nature, Vol. 151, No. 3,836, 8/5/43, pp. 517-519.)
660	10548	G.B.	*Education for Industry. XIV, Chemists' Training and Entry.* (Trade and Engineering Times, Vol. 52, No. 95, April, 1943, p. 23.)
661	10578	U.S.A. ...	*The American Engineer and the War Effort.* (A. A. Potter, Mech. Eng., Vol. 65, No. 4, April, 1943, pp. 251-252 and 258.)
			Aircraft Production Methods.
662	9800	Canada ...	*Assembly Line of Harvard Advanced Trainer.* (R. E. Crawford, Canadian Aviation, Vol. 16, No. 1, Jan., 1943, pp. 39-43.)
663	9872	U.S.A. ...	*Mass Production at the Consolidated Aircraft Corp.* (*Photograph*). (Am. Av., Vol. 6, No. 17, 1/2/43, p. 52.)
664	9875	U.S.A. ...	*Canadian Aircraft Production.* (Am. Av., Vol. 6, No. 17, 1/2/43, p. 56.)
665	9881	U.S.A. ...	*Glenn Martin P.B.M.-3 Mariners on the Assembly Line* (*Photograph*). (Am. Av., Vol. 6, No. 16, 15/1/43, p. 48.)
666	9884	U.S.A. ...	*Mass Production of Waco CG-4A Gliders* (*Photograph*). (Am. Av., Vol. 6, No. 16, 15/1/43, p. 51.)
667	9885	U.S.A. ...	*Mass Production of Grumman Fighters.* (Am. Av., Vol. 6, No. 16, 15/1/43, p. 54.)
668	9982	U.S.A. ...	*Ford's 15-Passenger Troop Carrying Gliders and New Glueing Process in Their Manufacture.* (Am. Av., Vol. 6, No. 20, 15/3/43, p. 60.)
669	10022	U.S.A. ...	*A Method of Applying Production Design to Aircraft.* (H. Harrison, S.A.E. Preprint, Nat. Aeron. Meeting, April 8-9, 1943.)
670	10252	U.S.A. ...	*Aircraft Industry in Latin America.* (W. R. Douglas, Aero Digest, Vol. 43, No. 3, March, 1943, pp. 118-120 and 400-403.)
671	10255	U.S.A. ...	*Lofting Problems of Streamline Bodies* (*Pt. II*). (C. M. Hartley and R. A. Liming, Aero Digest, Vol. 42, No. 3, March, 1943, pp. 185-192 and 380.)
672	10256	U.S.A. ...	*Fabrication of Aircraft Surfaces on Moving Assembly Lines.* (F. M. Reck, Aero Digest, Vol. 42, No. 3, March, 1943, pp. 207-215.)

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673	10295	Canada ...	*Assembly Line Construction of YAKI-26 Single-Seater Interceptors (Photograph).* (Flying, Vol. 32, No. 3, March, 1943, p. 25.)
674	10303	G.B.	*Lancaster Production.* (Flying, Vol. 32, No. 3, March, 1943, p. 41.)
675	10321	Canada ...	*Assembly Line of AT-16 Advanced Trainers (Photo).* (Canadian Av., Vol. 15, No. 12, Dec., 1942, p. 55.)
676	10322	G.B.	*De Havilland's Production of New "Mosquito."* (Canadian Av., Vol. 15, No. 12, Dec., 1942, pp. 60-61 and 100.)
677	10323	Canada ...	*Fairchild "Cornell" Trainer (Production).* (Canadian Av., Vol. 15, No. 12, Dec., 1942, pp. 62-63.)
678	10324	U.S.A. ...	*Boeing's at Work on New Catalina.* (Canadian Av., Vol. 15, No. 12, Dec., 1942, pp. 64-65.)
679	10325	Canada ...	*Consolidated Catalina Manufactured by Canadian Vickers (Photo).* (Canadian Av., Vol. 15, No. 12, Dec., 1942, pp. 71-72 and 98-99.)
680	10326	G.B.	*Lancaster Components Manufactured by Ottawa Car, Ltd.* (Canadian Av., Vol. 15, No. 12, Dec., 1942, p. 74.)
681	10393	U.S.A. ...	*The Production of Giant Planes.* (H. Woodhead, Autom. Ind., Vol. 88, No. 5, 1/3/43, pp. 9 and 50-51.)
682	10401	U.S.S.R. ...	*Yak-1 (1-26) Fighters on the Assembly Line.* (Autom. Ind., Vol. 88, No. 5, 1/3/43, pp. 9 and 50-51.)
683	10403	U.S.A. ...	*Power-Driven Assembly Line Applied to Aircraft Fabrication (Photograph).* (Autom. Ind., Vol. 88, No. 5, 1/3/43, p. 40.)
684	10491	U.S.A. ...	*North American Aircraft Assembly Plant at Texas.* (Engineer, Vol. 175, No. 4,559, 28/5/43, pp. 425-426.)
685	10587	Canada ...	*Willow Run Aircraft Plant.* (R. Stewart, Flying, Vol. 32, No. 5, May, 1943, pp. 21-23 and 150.)
		Engines, Propellers Production Methods.	
686	9814	U.S.A. ...	*One-Piece Hollow Steel Propeller Blades (Production Methods).* (J. Geschelin, Autom. Ind., Vol. 88, No. 2, 15/1/43, pp. 18-22.)
687	9841	U.S.A. ...	*Assembly Line Units Facilitate Handling of Radial Engines.* (Am. Av., Vol. 6, No. 11, 1/11/42, p. 39.)
688	9995	U.S.A. ...	*Mass Production of Stromberg Injection Carburettor.* (J. Geschelin, Autom. Ind., Vol. 88, No. 4, 15/2/43, pp. 18-22.)
689	10353	U.S.A. ...	*Short Cuts Speed Propeller Production.* (Aviation, Vol. 41, No. 11, Nov., 1942, pp. 151 and 320.)
690	10398	U.S.A. ...	*Mass Production of Aircraft Engine Cylinder Heads (Casting Processes, etc.).* (Autom. Ind., Vol. 88, No. 5, 1/3/43, pp. 26-29 and 47.)

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			General Methods and Equipment.
691	8969	U.S.A. ...	*Gang Riveting—A New Method of Riveting Employed by Curtiss Wright Corporation.* (Curtiss Flyleaf, Vol. 25, No. 4, Sept.-Oct., 1942, p. 19.)
692	9900	U.S.A. ...	*New Technique for Producing Formed Parts in Sheet Metals (Cecostamping).* (Autom. Eng., Vol. 33, No. 434, March, 1942, pp. 104-106.)
693	9922	G.B.	*The Manufacture of Nose Containers for Mortar Bombs.* (Machinery, Vol. 62, No. 1,588, 18/3/43, pp. 281-285.)
694	9957	G.B.	*Importance of Sand Control in Foundry Work.* (F. A. Allen, Metal Industry, Vol. 62, No. 19, 7/5/43, pp. 293-294.)
695	9987	Canada ..	*Forged Cylinder Heads and New Rapid Techniques in Manufacture.* (Commercial Aviation, Vol. 4, No. 12, Dec., 1942, p. 74.)
696	9988	Canada . .	*Reproduction of Templates by the Transphoto Process.* (Commercial Aviation, Vol. 4, No. 12, Dec., 1942, pp. 75-76.)
697	9996	U.S.A. ...	*Position Charts to Help Inexperienced Workers (Details given of Parts, Tools Required, etc.).* (Autom. Ind., Vol. 88, No. 4, 15/2/43, p. 23.)
698	10166	G.B.	*Plant and Process Problems (Contd.).* (D. G. P. Patterson, Sheet Metal Industry, Vol. 17, No. 193, May, 1943, pp. 803-807.)
699	10193	U.S.A. ...	*Possible Industrial Utilization of Starch Esters.* (J. W. Mullen and E. Paesu, Ind. and Eng. Chem., Vol. 35, No. 3, March, 1943, pp. 381-384.)
700	10266	Germany ...	*Production Short Cuts (Rivet Squeezer, Lofting Device, Router, etc.).* (Aero Digest, Vol. 42, No. 3, March, 1943, pp. 272-278.)
701	10332	U.S.A. ...	*Tube Bending in Bell Aircraft, Ltd.* (Canadian Aviation, Vol. 15, No. 12, Dec., 1942, pp. 124-128.)
702	10333	U.S.A. ...	*Removal of Broken Drills, Reamers, etc., from Drilled Holes (Pratt and Whitney Aircraft).* (Canadian Aviation, Vol. 15, No. 12, Dec., 1942, pp. 130-138.)
			Welding in Production.
703	9848	G.B.	*The Practical Control of Quality in Welding.* (W. J. Thaw, Mech. World, Vol. 115, No. 2,926, 9/4/43, pp. 375-378.)
704	10246	U.S.A. ...	*Improved Goggles for Flame Welders.* (Ind. and Eng. Chemistry (News Ed.), Vol. 21, No. 6, March, 1943, p. 418.)
705	10254	U.S.A. ...	*Arc Welding Aircraft Structures (Part II).* (W. S. Evans, Aero Digest, Vol. 42, No. 3, March, 1943, pp. 177-183.)
706	10281	U.S.A. ...	*Northrop's Heliarc Welding Process for Magnesium.* (U.S. Air Services, Vol. 27, No. 12, Dec., 1942, pp. 42-44.)

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707	10348	U.S.A. ...	*Maintenance and Inspection Routine Servicing and Repair of Arc Welding Equipment.* (R. F. Wyer, Aviation, Vol. 41, No. 11, Nov., 1942. pp. 133-136 and 328-331.)
			Machine Tools.
708	10125	G.B.	*The Steinle Centreless Thread Generator.* (Machinery, Vol. 62, No. 1,593, 22/4/43, pp. 430-434.)
709	10261	U.S.A. ...	*Maintenance Steps to Prolong Instrument Life.* (T. A. Cohen, Aero Digest, Vol. 42, No. 3, March, 1943, pp. 244-251.)
710	10274	U.S.A. ...	*Vultee Automatic Rivet Injector.* (Aero Digest, Vol. 42, No. 3, March, 1943, pp. 406-407.)
711	10347	U.S.A. ...	*Tool Design and the Use of Isometric Drawings for Speeding Production.* (J. J. Scheppe, Aviation, Vol. 41, No. 11, Nov., 1942, pp. 129 and 280.)
			War Plants.
712	9838	U.S.A. ...	*New Clinip Assembly Plant in Arizona.* (Am. Av., Vol. 6, No. 11, 1/11/42, p. 56.)
713	9843	U.S.A. ...	*Successful Camouflage for U.S. War Plants and Army Installations Developed by U.S. Army Engineers.* (Am. Av., Vol. 6, No. 11, 1/11/42, p. 47.)
714	10122	G.B.	*The Willow Run Bomber Plant.* (Machinery, Vol. 62, No. 1,593, 22/4/43, pp. 421-427.)
715	10283	U.S.A. ...	*Method of Fire Hazard (Classification of Building Materials).* (A. J. Steiner, A.S.T.M. Bulletin, No. 121, March, 1943, pp. 19-22.)
716	10559	U.S.A. ...	*Complete Conversion of Automotive Plant to Production of Aircraft (General Motors) (Photo).* (U.S. Air Services, Vol. 28, No. 2, Feb., 1943, p. 33.)
			Salvage.
717	9960	G.B.	*Segregation and Reclamation of Scrap.* (L. S. Deitz, Metal Industry, Vol. 62, No. 19, 7/5/43, pp. 295-296.)
718	10007	U.S.A. ...	*Vegas Scrap Conservation Programme.* (Autom. Ind., Vol. 88, No. 4, 15/2/43, pp. 36-37 and 84-88.)
719	10061	U.S.A. ...	*Curtiss Wright Salvage Scheme.* (Curtiss Flyleaf, Vol. 25, No. 4, Sept.-Oct., 1942, pp. 8-9.)
720	10291	G.B.	*The Reclamation of Porous Castings (Technical Bulletin, April, 1943).* (E. J. H. Jones, J. Inst. Prod. Engs., Vol. 22, No. 4, April, 1943.)
721	10583	U.S.A. ...	*Scrap-Saving Methods Support the War Effort.* (B. D. Kunkle, Mech. Eng., Vol. 65, No. 4, April, 1943, pp. 267-273.)
			Workers' Welfare.
722	9840	U.S.A. ...	*Indirect Mercury Lighting in Industrial Plants.* (Am. Av., Vol. 6, No. 11, 1/11/42, p. 39.)

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723	9926	G.B. ...	*Dust Removal Equipment in a Shadow Factory.* (Machinery, Vol. 62, No. 1,588, 18/3/43, pp. 298-300.)
724	10050	U.S.A.	*The Use and Planning of Works Music (Paper Presented A.S.M.E.).* (H. Burris-Meyer, Mech. World, Vol. 113, No. 2,934, 26/3/43, pp. 338-339.)
725	10073	U.S.A.	*Music in Industry.* (H. Burris-Meyer, Mech. Eng., Vol. 65, No. 1, Jan., 1943, pp. 31-34.)
726	10117	G.B. ...	*Modern Developments in Heating.* (F. Buckingham, Mech. World, Vol. 113, No. 2,938, 23/4/43, pp. 433-436.)
727	10196	G.B. ...	*Health in the Magnesium Industry.* (H. R. Gay, Metal Industry, Vol. 62, No. 20, 14/5/43, pp. 309-310.)
728	10220	U.S.A.	*Explosion Hazards in the Chemical Industry.* (T. A. Cohen, Ind. Eng. and Chem. (News Ed.), Vol. 21, No. 5, March 10, 1943.)
729	10475	U.S.A.	*Safety in Army Ordnance Establishments.* (C. Field, A.S.M.E. Preprints, April 26-28, 1943, pp. 1-7.)
730	10545	G.B. ...	*Safety Precautions in British Factories.* (W. Garrett, Trade and Engineering Times, Vol. 52, No. 95, April, 1943, p. 10.)
731	10547	G.B. ...	*Music in Factories.* (Trade and Engineering Times, Vol. 52, No. 95, April, 1943, p. 22.)
			Women in Industry.
732	10091	Germany	*Women in German Aircraft Industry (Photo).* (Luftwissen, Vol. 10, No. 3, March, 1943, p. 87.)
733	10253	U.S.A.	*The Influence of Women on Aircraft Production Methods.* (W. G. Tuttle, Aero Digest, Vol. 42, No. 3, March, 1943, pp. 142-143 and 195-199.)

Land and Water Transport.

			Trucks and Trailers.
734	9842	U.S.A.	*Huge Trucks for Hauling Bomber Parts (Photo).* (Am. Av., Vol. 6, No. 11, 1/11/42, p. 40.)
735	9868	U.S.A.	*Motorized Lift Truck.* (Am. Av., Vol. 6, No. 17, 1/2/43, p. 48.)
736	9904	U.S.A.	*Tractor-Trailer Combination for Transporting Aircraft Parts.* (Autom. Eng., Vol. 33, No. 434, March, 1942, p. 116.)
737	10565	Germany	*Details of Caterpillar Tracks for Heavy Rescue Army Lorry.* (C. Rabe, Motor Schau., Vol. 7, No. 2, Feb., 1943, pp. 54-57.)
738	10569	Germany	*Heavy Caterpillar Trucks for the German Army Fitted with Rescue Winch.* (C. Rabe, Motor Schau., Vol. 7, No. 3, March, 1943, pp. 90-94.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
			Tanks.
739	9888	U.S.A. ...	*Women Repairing a 28-Ton M.3 Medium Tank.* (Army Ordnance, Vol. 22, No. 134, Sept.-Oct., 1942, p. 276.)
740	9891	G.B.	*British Covenanter Tanks in Mass Production (Photo).* (Army Ordnance, Vol. 22, No. 134, Sept.-Oct., 1942, p. 289.)
741	9895	U.S.A. ...	30-*Ton Medium Tank, M.4 (Two Views).* (Army Ordnance, Vol. 22, No. 134, Sept.-Oct., 1942, p. 306.)
742	10003	U.S.A. ...	*Cardillac M.S. Light Tank (Photograph).* (Autom. Ind., Vol. 88, No. 4, 15/2/43, p. 52.)
743	10055	G.B.	*Constructional Methods and Materials for Pickling Tanks.* (A. J. T. Eyles, Mech. World, Vol. 113, No. 2,931, 5/3/43, p. 247.)
744	10113	G.B.	*Structural Failure of the Welded Tanker "Schenectady."* (Engineering, Vol. 155, No. 4,034, 7/5/43, p. 376.)
745	10402	U.S.A. ...	*America's M.7 Tank (Photograph).* (Autom. Ind., Vol. 88, No. 5, 1/3/43, p. 39.)
			Electric and Gas-Driven Vehicles.
746	9994	U.S.A. ...	*Interchangeability of Parts for Army Vehicles.* (E. L. Warner, Autom. Ind., Vol. 88, No. 4, 15/2/42, pp. 17 and 76-78.)
747	10171	G.B.	*Battery Electric Vehicles.* (J. W. Macfarlane, Sheet Metal Industry, Vol. 17, No. 193, pp. 856-859 and 862.)
748	10478	U.S.A. ...	*Wartime Replacement Parts.* (R. Cass, S.A.E. Preprint, May 5-6, 1943, pp. 1-13.)
749	10500	U.S.A. ...	*Electrically Operated Friction Brake for Transport Vehicles.* (Sci. Am., Vol. 168, No. 3, March, 1943, p. 124.)
750	10568	Germany ...	*Mass Production of Gas Generators for Transport Vehicles.* (Motor Schau., Vol. 7, No. 2, Feb., 1943, pp. 66-71.)
			Boats.
751	10571	Germany ...	*Gliding Boats for High Speed River Traffic.* (H. v. Romer, Motor Schau., Vol. 7, No. 3, March, 1943, pp. 102-104.)
			Electricity.
			Photo-Electric Cells.
752	10172	G.B.	*The Spectral Response of Photo-Electric Cells.* (T. M. Chance, Electronic Engineering, Vol. 15, No. 182, 4/5/43, pp. 501-504.)
753	10173	G.B.	*Some Measurements on Selenium Photo-Cells.* (G. A. Veszi, Electronic Engineering, Vol. 15, No. 182, 4/5/43.)
754	10174	G.B.	*Smoke Density Meters Using Photo-Cells.* (R. F. Wey, Electronic Engineering, Vol. 15, No. 182, 4/5/43, pp. 507-514.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
755	10175	G.B.	*Photo-Electric Voltage Control Gear.* (K. A. R. Samson, Electronic Engineering, Vol. 15, No. 182, 4/5/43, pp. 516-518.)
756	10177	U.S.A. ...	*Table of American Photocells.* (Electronic Engineering, Vol. 15, No. 182, 4/5/43, p. 525.)
			Electron Diffraction.
757	10508	U.S.A. ...	*Electron Diffraction.* (G. P. Thompson, Engineer, Vol. 175, No. 4,558, 21/5/43, p. 409.)
			Miscellaneous.
758	10176	G.B.	*The Electric Activity of the Human Brain.* (G. Wey, Electronic Engineering, Vol. 15, No. 182, 4/5/42, pp. 519-522.)
759	10292	G.B.	*Some Factors Affecting the Design of Alternators for Switch Gear Testing.* (V. Easton, J. Inst. Elect. Engs., Part I, Vol. 90, No. 28, April, 1943, pp. 174-175.)
760	10293	G.B.	*New Frequency Comparison Circuit for the Cathode Ray Tube.* (G. H. Rawcliffe, J. Inst. Elect. Engs., Vol. 90, No. 28, April, 1943, p. 176.)
			Photography.
761	9908	Germany ...	*Photographic Method for Investigating Short Period Rolls of Photographic Reconnaissance Aircraft.* (M. Nazel, Luftwissen, Vol. 10, No. 2, Feb., 1943, pp. 36-37.)
762	10120	G.B.	*Association for Scientific Photography.* (Nature, Vol. 151, No. 3,833, 17/4/43, p. 443.)
			Meteorology (Thunderstorms).
763	10342	U.S.A. ...	*Meteorological Characteristics of Thunderstorms—Part II.* (G. N. Brancato, Aviation, Vol. 41, No. 11, Nov., 1942, pp. 100-103, 315-331.)
764	10521	G.B.	*Measurement of Lightning.* (Nature, Vol. 151, No. 3,836, 8/5/43, p. 537.)
			Physiology and Aviation Medicine.
765	9914	Germany ...	*Physiological Problems of Long Distance and Night Flying (Digest of Lilienthal Lecture).* (F. Ruff, Luftwissen, Vol. 10, No. 2, Feb., 1943, p. 61.)
766	9917	U.S.A. ...	*Mechanical Analysis of Survival in Falls from Heights of Fifty to One Hundred and Fifty Feet.* (H. De Haven, War Medicine, Chicago, July, 1942, Vol. 2, No. 4, pp. 586-596. Bull. of War Med., Vol. 3, No. 8, April, 1943, p. 465.)
767	9918	U.S.A. ...	*Otolaryngological Problems of Aviation in World War—II.* (P. A. Campbell, Ann. Otol. Rhinol. and Laryngol., Vol. 51, No. 2, June, 1942, pp. 293-300. Bull. of War Med., Vol. 3, No. 8, April, 1943, pp. 465-466.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
768	9919	U.S.A.	... *The Effect on Hearing of Experimental Occlusion of the Eustachian Tube.* (W. E. Loch, Ann. Otol, Rhinol. and Laryngol., June, 1942, Vol. 51, No. 2, pp. 396-405. Bull. of War Med., Vol. 3, No. 8, April, 1943, p. 466.)
769	9920	U.S.A.	... *The Nature of the Valvular Action (Passive Opening) of the Eustachian Tube in the Relation to Changes of Atmospheric Pressure and Aviation Pressure Deafness.* (J. E. G. McGibbon, J. Laryngol. and Otol., July, 1942, Vol. 57, No. 7, pp. 344-350. Bull. of War Med., Vol. 3, No. 8, April, 1942, pp. 466-468.)
770	9921	Germany	... *The Differential Sensitivity of the Dark-Adapted Eye.* (Ophthalmologica, Sept., 1942, Vol. 104, No. 3, pp. 157-165. Bull. of War Med., Vol. 3, No. 8, April, 1943, pp. 468-469.)
771	10027	U.S.A.	... *An Engineering Discussion of the Desiccation of Human Blood Plasma.* (D. C. Pfeiffer, A.S.M.E. Preprint, April, 26-28, 1943.)
772	10415	G.B. ...	... *Anoxæmic Changes in the Liver, with Regard to the High Altitude Death of Airman.* (P. Ladewig, Nature, Vol. 151, No. 3,837, 15/5/43, pp. 548-551.)
773	10555	Germany	... *Colorimetric Methods for Determining the Concentration of Trinitrotoluol Dust or Vapour in the Air.* (Z.G.S.S., Vol. 38, No. 2, Feb., 1943, p. 32.

Mathematics and Physics.

774	9910	Germany	... *Nomogram for Determining the Number of Separate Drawing Operations Required to Produce a Given Ratio in Diameters.* (G. Soph and W. Frey, Luftwissen, Vol. 10, No. 2, Feb., 1943, p. 43.)
775	10180	Germany	... *Notes on Controlled Type of One Dimensional Motion (Solution of Second Order Non-Linear Differential Equation).* (H. Bilhary, Z.A.M.M., Vol. 22, No. 4, Aug., 1942, pp. 206-215.)
776	10181	Germany	... *Determination of Most Favourable Interval for the Numerical Integration of Systems of Differential Equation.* (L. Collatz, Z.A.M.M., Vol. 22, No. 4, Aug., 1942, pp. 216-225.)
777	10182	Germany	... *Sub-Division of a Positive Quantity into Positive Parts. Probability of Parts not Exceeding a Certain Limit.* (H. Hadwiger, Z.A.M.M., Vol. 22, No. 4, Aug., 1942, pp. 226-232.)
778	10183	Germany	... *Differential Equations—Method of Solution and Collection of Typical Solutions for Reference (Additions will be Published Periodically in Z.A.M.M.).* (E. Kanke, Z.A.M.M., Vol. 22, No. 4, Aug., 1942, pp. 233-234.)
779	10184	Germany	... *Conditions for Solution of a System of Equation by Iteration.* (G. Schulz, Z.A.M.M., Vol. 22, No. 4, Aug., 1942, pp. 234-235.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
780	10185	Germany ...	*Interpolation in Table having Unequal Steps.* (J. Hernhold, Z.A.M.M., Vol. 22, No. 4, Aug., 1942, pp. 234-235.)
781	10411	G.B.	*The Theory of Emulsions and Their Technical Treatment (Book Review).* (W. Clayton, Nature, Vol. 151, No. 3,837, 15/5/43, p. 542.)
782	10536	Germany ...	*On the Calculation of Approximate Vapour Pressure Laws.* (J. Esser, Z.G.S.S., Vol. 38, No. 2, Feb., 1943, pp. 25-29.)
783	10539	G.B.	*Analytical Geometry in Common Layouts (I). The Case of an Undercarriage about a Single Axis.* (S. J. Garvey and K. W. Hertzel, Airc. Eng., Vol. 15, No. 171, May, 1943, pp. 132-134 and 143.)

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Notices and abstracts from the Scientific and Technical Press are prepared primarily for the information of Scientific and Technical Staffs. Particular attention is paid to the work carried out in foreign countries, on the assumption that the more accessible British work (for example that published by the Aeronautical Research Committee) is already known to these Staffs.

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NOTE.—As far as possible, the country of origin quoted in the items refers to the original source.

A Note on the Effect of Wind Tunnel Size on Pitching Moments. (Th. Troller, Kármán Anniversary Vol. of App. Mechanics, 1941, pp. 231-236.) (114/1 U.S.A.)

The main conclusions are:—

1. The effect of the wind tunnel dimensions on the pitching moment of large streamlined bodies can be of such magnitude as to impair seriously the value of such tests. An analytical method of finding correction factors is not available and appears difficult to obtain.

2. For pitching moment effects on wings spanning the whole stream a simple correction method can be given.

According to the existing aerodynamic theory on wind tunnel effects, there should be an additional curvature of the air stream existing at the position of the wing, caused by the restraining action of the dimensions of the finite air stream. The curvature is of such direction as to increase slightly the lift at a given angle of attack of the wing in a closed tunnel and to decrease the lift in an open air stream. We may assume that the corrective lift force acts at the half-chord point of the aerofoil and therefore has a moment about the quarter-chord point equal to $\Delta Lc/4$.

Test results for the three different conditions are given, and it is assumed that the tests in the variable-density tunnel of the N.A.C.A., due to the small dimension of the model relative to the tunnel diameter, require no wind tunnel

correction on pitching moment. There is also given a theoretical curve for model and wind tunnel dimensions corresponding to the tests reported. This theoretical curve is obtained by assuming that a corrective pitching moment is due to Δc_L values as given below for various ratios of the chord to the closed wind tunnel cross section, c=wing chord, k=cross section of air stream.

c/k	0.1	0.2	0.3	0.4	0.5
$\Delta c_L c_L^{\infty}$	0.02	0.043	0.063	0.083	0.100

The corrective pitching moment coefficient is assumed to be equal to $\Delta c_m = -\Delta c_L/4$. The value Δc_m deduced from the curve for the test results in the variable-density tunnel gives the line marked "theoretical."

On applying the results reasonable agreement is obtained. Further refinements of the method are possible. For instance, by substituting for one bound vortex at the quarter-chord point of the wing two or more vortices distributed in a simple manner along the chord it might be possible to obtain better approximations for the wind tunnel correction of still larger wings in a not too complicated manner.

Condenser Scoop Design. (E. F. Hewins and J. R. Reilly, Society of Naval Architects and Marine Engineers. Transactions, Vol. 48, 1940, pp. 277-304.) (114/2 U.S.A.)

It is common practice in the case of high speed steam ships to obtain the necessary cooling water for the condenser by connecting a branch circuit to two holes in the ship's bottom.

The holes may be either at the same distance from the bow but displaced laterally, thus giving rise to an athwartship installation for the condensers, or the holes may be at different longitudinal distances. In either case the object is to produce the maximum possible dynamic head at entry combined with as great a suction head as possible at delivery. For this purpose the entry hole (usually of rectangular section) is connected to a lead-in pipe set at an angle of about 35 degrees with the ship's bottom and sloping towards the rear. This so-called inlet scoop does not project outside the hull. The outlet scoop on the other hand consists of a circular pipe placed at right angles to the hull and provided with a lip on its forward wall which projects into the water.

The author investigates this problem experimentally using an 8 ×8 in. channel passing about 3,000 gallons/minute.

The condenser circuit consisted of 2 in. circular piping with an outlet scoop of the same diameter whilst the rectangular section of the inlet scoop could be varied. This section is flared so as to join up smoothly with the circular pipe.

The flow through the condenser circuit was measured by means of orifice plates and could be varied between 0 and 60 gallons/minute, the maximum flow thus corresponding to only 3 per cent. of the flow in the main channel. Under these conditions, for any inlet scoop, the static head in the inlet pipe was constant for a given flow regardless of type of exit scoop employed. Similar results were obtained with the exit scoop. The two scoops thus act independently and their performance is investigated separately.

Whilst the static head in the outlet scoop increases steadily with the flow through the scoop, the static head in the inlet pipe, after a preliminary increase shows a sharp drop at higher rates of flow. This drop is due to eddy formation at the forward wall of the inlet and could not be prevented by the provision of guide vanes.

Removal of the slowly moving boundary layer by means of a small centrifugal pump was beneficial but led to a loss of about 10 per cent. in the flow. The relatively poor performance of both scoops is mainly due to the fact that they operate within the boundary layer, i.e. a region where there is very marked change in speed with distance from wall. The water filaments entering the scoop have thus very different energy contents and very complicated flow results.

As a result of mixing losses only about 50 per cent. of the free stream dynamic head is available at the inlet scoop. This was illustrated by means of flow patterns obtained by treating the walls of the scoop with a mixture of soot and oil.

If the velocity distribution in the boundary layer is known, it is possible to estimate the average dynamic head available in the scoop, provided the free stream velocity head is known. This problem was investigated by the author making use of pitot and static surveys. The results are incorporated in a series of design charts covering the types of scoop experimented with.

With the help of these charts, full scale installations can be designed.

As an example, the installation on SS. " America " utilises 36 in. piping and passes 40,000 gallons/minute at ship speed of 24 knots.

Inlet and outlet scoops similar to those tested by the author were utilised. Applying the appropriate corrections, the following values are obtained.

It will be noted that the agreement between calculated total head and estimated resistance of circuit under observed flow conditions is satisfactory.

Free stream velocity head	24.5 feet
Thickness of boundary layer at inlet scoop	58.5 inches
Average head available at inlet scoop	13.6 feet
Head produced by inlet scoop	9.6 feet
Thickness of boundary layer at outlet scoop ...	63 inches
Head available at outlet scoop	13.8 feet
Suction head produced by outlet scoop	-5.26 feet
Total head produced	14.96 feet
Observed flow	40,000 gallons
Estimated resistance	15.50 feet

It will be noted that in this design only about half of the free stream dynamic head is available at the inlet scoop and of this a further 30 per cent. is lost before the water reaches the condenser intake. On the other hand the projecting lip at the exit converts about 30 per cent. of the free stream head into suction.

In conclusion it must be emphasised that the author's tests cover only the efficiency of the scoop from the point of view of water circulation. The additional resistance to propulsion of the ship is not considered. According to some Italian tests, this may amount to as much as 10 per cent. of the total ship drag at cruising speed, but appreciably less at maximum speed. On the other hand, the simplicity of the circuit and the absence of any mechanical pumps present enormous advantages.

In the discussion following on the author's paper attention is called to the need of further experiments on the boundary layer effect, including cavitation. It is agreed that boundary layer phenomena are the basis of the operation of the scoop and this is one of the reasons why tests on such circuits cannot be carried out with air as the working medium. This is to be regretted, since the use of air has proved very convenient in other hydraulic investigations.

Calculation of the Second Approximation of the Two-Dimensional Compressible Potential Flow about a Profile by the Janzen-Rayleigh Method. (E. Krahn, L.F.F., Vol. 20, No. 5, 16/6/43, pp. 147-151.) (114/3 Germany.)

The calculation of the second approximation to the compressible two-dimensional adiabatic potential flow about a profile at subsonic speeds by the Janzen-Rayleigh method required the solution of

$$\Delta\phi = (M^2/U^2)\,(u^2 u_x + uv\,(u_y + v_x) + v^2 v_y)$$

where

Δ = Laplace operator.
ϕ = potential of compressible flow.
M = Mach number.
U = incident flow velocity.

Suffixes $_x$ and $_y$ denote partial differentiation.

The function ϕ must be singly determined and finite in the whole region external to the profile (with the exception of the point at infinity).

In addition, the derivatives of ϕ must fulfil the condition of tangential flow at the profile and parallel flow at a great distance from the profile.

This problem has been solved for the circle, the ellipse and the Joukowsky profile, making use of the transformation function of the profile on to the circle together with a knowledge of the potential function of incompressible flow over the whole plane.

Since generally only the velocity distribution at the profile itself is of interest, the author indicates an alternative method in which the calculation is restricted to the region of the profile contour. For this purpose apart from the velocity of incompressible flow at the profile contour only the transformation function of the profile on to the circle and its derivative at the profile need be known, the field outside the profile being neglected.

The method is illustrated by worked out examples covering the case of a cylinder with circulation and an arbitrary profile respectively. Due to the compressibility effects, there is an appreciable increase in lift in both cases.

Contributions to Profile Research—III. Calculation of the Lift Distribution (First Approximation) with a Correction for the Region of the Profile Nose. (F. Kenne, L.F.F., Vol. 20, No. 5, 16/6/43, pp. 152-170.) (114/4 Germany.)

Known methods for the calculation of the velocity distribution about a given profile are based on conformal transformation of the profile on to a circle. Exact solutions are only possible in relatively few cases for which the transformation function is sufficiently simple. Even then the amount of labour involved may be considerable.

For the general case of an arbitrary profile the approximate method of Theodorsen can be employed, which, however, is fairly complicated and moreover suffers from the defect that the amount of labour involved is practically the same whether the profile is relatively thin or thick.

Since most practical profiles are relatively thin and only slightly curved, a method of approximation based on a source-vortex distribution suggests itself, the distribution being such that the profile contour becomes a stream line for parallel incident flow. This method is naturally more accurate for thin than for thick profiles and will give an exact solution in the limiting case of a line profile of zero curvature.

Provided the maximum thickness (chord ratio is less than .2, and the maximum curvature less than .1), the velocity on the profile contour can be put equal to the u component of the total velocity along the x axis as a first approximation. The singularities are distributed along the same x axis.

The author has tabulated the required source distribution and the resultant induced excess velocity for a series of thickness distributions under symmetrical flow conditions. These excess velocity components are multiplied with the corresponding thickness constants (depending on the form parameter of the profile) and when added to the incident flow velocity in the x direction yield the resultant flow of the symmetrical profile at zero incidence.

Profile curvature and incidence are allowed for by an additional vortex distribution which is also given in a tabular form for various curvature characteristics and angles of incidence, making use of data already published by Birnbaum. The excess velocity components given in the table are multiplied by the corresponding curvature constants and added or subtracted from the stream velocity at the profile, depending on whether the suction or pressure side is considered.

The resultant velocities on the profile contour are exact only for the case of an infinitely thin profile. They represent, however, a very good approximation for finite thicknesses except in the region of the nose, where linearity between the different components no longer exists.

In this region the difference in velocity between the true contour and the axis (along which the source/vortex distribution is assumed) must be taken into consideration. This is allowed for by a correction in the distribution such that both the tangent and the curvature of the stream line at the front vortex point agree with those of the profile contour. The calculation is first carried out for the particular angle of incidence corresponding to tangential entry. Since the velocities vary in exact proportion with the incidence, the calculation need only be repeated for one further angle of incidence.

A comparison of the distribution of excess velocity as obtained by direct measurement, conformal transformation and the author's approximate method in the case of a symmetrical profile shows excellent agreement.

In conclusion, the author gives a complete lay-out of the method for the rapid calculation of the velocity distribution for an arbitrary profile which does not necessitate any knowledge of the theory and can be carried out rapidly by any competent computor. Provided the six thickness constants of the profile and the four curvature characteristics of the Birnbaum skeleton are known, a complete drawing of the profile is not required.

Pre-Rotation of Landing Wheel Tyres. (C. A. Mason and W. H. Elliott, S.A.E., National Aeronautics Meeting, April 8-9, 1943.) (Preprint available.) (114/5 U.S.A.)

The average life of a 17.00 × 16 aircraft tyre corresponds to about 3,000 miles, say 800 landings and take-offs, averaging 3½ miles. The rubber lost per mile is over 50 times that of a 6.00 × 16 passenger car tyre (.0057 against .0001). Part of this wear is due to the fact that on landing the wheel must be accelerated very rapidly from rest to a peripheral speed of the order of 100 m.p.h.

It is obvious that wear would be reduced if the wheel could be spun by some outside agency before contacting the ground. To achieve ground speed (and thus prevent slip) the wheel would have to rotate at over 600 r.p.m. for some time prior to landing. Such high speeds are not feasible, mainly on account of balancing difficulties. If the preliminary peripheral speed is limited to about half initial ground speed, the tread abrasion is reduced by about 25 per cent. and the life of the tyre increased by the corresponding amount. This shows that the possible gain in life is not very great and may be overshadowed by the cost and weight of the pre-spinning equipment.

The simplest method of producing preliminary rotation appears to be direct operation by the relative wind, the tyre being fitted with vanes for this purpose. Flight tests on a B-17C indicate that tyres of this type (manufactured by Goodrich) accelerated to about half landing speed in about two minutes, the aircraft speed being 150 m.p.h.

A set of these tyres weighs 10 lb. more than the standard equipment and the cost is 15 per cent. greater (£29 against £25). Bearing in mind that one lb. of extra weight represents a revenue loss under civil operation of the order of £5, the drive is uneconomical, even if a 20 per cent. increase in tyre life results. (A loss of £28 in a year's operation, assuming 4,200 hours service per year and a standard tyre life of 800 hours.)

The same line of reasoning shows that mechanical pre-rotation can only be economical if the cost including loss of revenue does not exceed £55 per year for the aircraft in question.

The authors state that a motor driven device has been tried by one of the largest American aircraft manufacturers, but no details are available.

New Wind Shield Developments. (A. L. Morse, S.A.E., National Aeronautics Meeting, April 8-9, 1943.) (Preprint available.) (114/6 U.S.A.)

A compressed air catapult is described which enables freshly killed bird carcasses weighing up to 16 lbs. to be projected at speeds up to 400 miles per hour against a wind shield. The experimental panels were plane rectangles, $13\frac{3}{8}$ in. high and $57\frac{3}{8}$ in. wide, the experiments covering the effect of bird weight, speed, angle and point of impact, panel temperature, method of support and type of construction of panel. The impact strength of the panel was expressed in terms of the minimum projectile velocity causing penetration.

The experiments indicate that a $\frac{1}{2}$ in. glass-vinyl laminated windshield consisting of outside layers of semi-tempered glass $\frac{1}{8}$ in. thick with a vinyl plastic interlayer $\frac{3}{8}$ in. thick and preceded by a $\frac{1}{4}$ in. fully tempered de-icing glass with an air gap of $\frac{1}{4}$ in. gives complete security against collision with birds weighing up to 4 lbs. and a high degree of protection with larger birds weighing up to 20 lb.

The net increase in weight over standard double glazed wind shields on a Douglas DC 3, is of the order of 15 lb. and this includes reinforcement of the supporting structure. The optical characteristics are stated to be acceptable.

It is interesting to note that the impact strength of such laminated glass-vinyl shields decrease rapidly with temperature. This is the main reason for adopting the hot air type of de-icer on this screen, the air circulating between the $\frac{1}{2}$ in. panel and the $\frac{1}{4}$ in. tempered glass sheet placed in front.

This ensures that the vinyl plastic interlayer is kept at an optimum temperature of 75° to 120°F. depending on plasticizer content. In order to obtain maximum impact resistance under all conditions, this temperature must be maintained even in the absence of any icing.

The mounting of impact resisting wind shields requires special attention as otherwise the shield may be pulled out of the frame. It is essential that the plastic interlayer should extend beyond the edges of the glass and around the entire periphery to provide means for bolting the panel on to the frame. Any tendency of the bolts to tear out of the plastic can be greatly reduced by moulding a thin strip of aluminium (.025 in.) on to the edge. Maximum restraint should be at the ends of the panel and minimum restraint along the top and bottom edges.

Multi-Purpose Aircraft Design Utilising a Detachable Fuselage (Deysher and Hubbs Plane). (American Aviation, Vol. 6, No. 22, 15/4/43, pp. 46-54.) (114/7 U.S.A.)

A revolutionary multi-purpose aircraft design equally efficient in commercial or war transport, utilizing a detachable " fuselage " which can be hauled to and from an airport by an ordinary truck tractor, is announced by Harvey M. Deyster and his collaborator, Harold K. Hubbs.

The detachable unit, resembling a standard highway trailer, can be loaded at a plant or military base, towed by truck to an airport, attached to a waiting plane, flown to another airport, and the operation reversed. No time is lost in airport loading or unloading. Alternate designs call for twin-boom aircraft which can haul two trailer or fuselage units at once. Furthermore, the inventor claims that his plane can fly satisfactorily without the unit.

In addition to using the carrier as a shipping container, the operator can capitalize on ability of the plane to fly empty by transporting any number of such units in a one-way stream to an area demanding an emergency hospital, mess halls, emergency light and power stations, machine and repair shops, or signal and transmitting equipment. Thus a hospital, with emergency operating equipment and cots, could be set up in a few hours, hundreds of miles distant, and could be removed as quickly.

Aerodynamic Performance of the Towed Glider. (A. Klemin and W. C. Walling, J. Aeron. Sc., Vol. 10, No. 6, June, 1943, pp. 185-196.) (114/8 U.S.A.)

In Part I of this paper the authors enumerate certain simple aerodynamic expressions useful in determining the performance of a glider train (tug + one or identical gliders).

Both the rate of climb and level speed of the train is most simply expressed in terms of so-called fictitious speeds, defined as follows:—

V_{fsa} = fictitious sinking speed of tug $= V/E_a$
V_{fsg} = ,, ,, ,, glider $= V/E_g$
V_{fst} = ,, ,, ,, train $= V_{fsa} + (nW_g/W_a)\, V_{fsg}$
V_{fca} = ,, rate of climb of tug $=$ (brake h.p./W_a) $\times \eta$

where

V = level flight speed.
$E_a = L/D$ for tug.
$E_g = L/D$ for glider.
W_a = weight of tug.
W_g = weight of glider.
n = weight of glider.
η = propulsive efficiency of tug engine.

We then have

$$\text{actual rate of climb of train} = (V_{fca} - V_{fst}) \{ W_a/(W_a + nW_G) \}$$

at the level flight speed V, $V_{fca} = V_{fst}$.

By plotting both V_{fca} and V_{fst} on a V basis, this speed can be readily determined by the intersection of the curves.

Similarly, the maximum intercept between the two curves will determine the corresponding airspeed for maximum rate of climb whilst the tangent for the origin to the V_{fst} curve determines the speed for maximum range, on the assumption that the specific fuel consumption is independent of V.

Since V must satisfy the expression

$$V = (2w/\rho)^{\frac{1}{2}}\, (1/C_L)^{\frac{1}{2}}$$

where

w = wing loading,

the fictitious sinking speeds also depend on the wing loading, *i.e.*,

$$V_{fs} = (2w/\rho)^{\frac{1}{2}} \{ C_D/(C_L)^{3/2} \}$$

By plotting the fictitious sinking speeds at various wing loadings both for the tug and the gliders, it is possible to draw some conclusions on the effect of these two factors on the overall performance. Speaking generally, W_g should be less than w_a. If, however, only a single small glider is attached to a fast heavy tug, the cruising speed is affected least by adopting a high wing loading for the glider. Although a reduction of the wing loading of the tug below conventional figure would increase the rate of climb, the accompanying drop in the cruising speed of the train might become dangerous.

From the above it appears that definite conclusions can only be drawn from worked out examples and for this purpose the author selects the Lockheed Lodestar towing one to three gliders each with a payload of the same order as that of the tug for zero range.

The structural weight of the glider is based on that of the Lodestar without engine nacelles.

As the stalling speed of the Lodestar is 93 m.p.h. the minimum level flight speed of the glider train was arbitrarily fixed at 115 m.p.h. This, together with the need of a low landing speed of the disconnected glider, led to a choice of 20 lb./sq. foot for the wing loading of the glider (aspect ratio 12).

Other pertinent data are collected in the following table:—

	Tug.	Glider.
Gross weight (lb.)—		
Take-off	18,500	—
Landing	17,500	13,800
Weight empty	12,000	7,300
Crew and equipment	440	440
Payload	5,060	6,060
	(up to 400 miles)	
H.P.	2,400 (take-off)	—
	1,400 (cruising)	—
Wing loading	33.6 lb./sq. ft.	20 lb./sq. ft.
Aspect ratio	7·78	12
Profile drag coefficient	.009	.009
Total parasite drag coefficient ...	.021	.0112
Nacelle drag coefficient	.007	—
Normal fuel load	3,860 lb.	—
With extra tanks	5,700 lb.	—
Max. range (normal tanks)	1,800 miles	—
Payload (corresponding)	2,000 lb.	—
Max. range (extra tanks)	2,800 miles	—
Payload (corresponding)	None	—

The comparison of the Lodestar by itself with a glider train falls under the heading of air speed, rate of climb, range and payload.

Naturally, the first three factors must be less for the train than for the tug alone.

On the other hand, the payload is increased to such an extent that the glider train becomes very attractive for certain purposes.

The following presents a selection from the author's calculations. All the data apply to a constant altitude of 5,000 feet.

(1) Max. speed and climb (Lodestar 18,500 lb.) /(Glider 13,800 lb.):—

	Tug alone.	+ 1 G.	+ 2 G.	+ 3 G.
Max. true air speed (m.p.h.) ...	260	200	170	140
Max. rate of climb (feet/min.) ...	1,700	700	300	200

(2) Range and payload (normal fuel tanks):—

	Tug alone.	+ 1 G.	+ 2 G.	+ 3 G.	
Range (m)	1,800	1,100	800	600	Speed for max. range.
Payload (lb.)	2,000	8,000	14,000	20,000	
Speed (m.p.h.)	135	125	120	115	
Range	1,200	950	750	550	Cruising h.p. (1,400).
Payload	2,000	8,000	14,000	20,000	
Speed	225	175	145	120	

(3) Comparison at a given range is facilitated by the following three factors:—

$$\text{Payload factor } P = \text{Payload train/payload of tug.}$$

$$\text{Advantage factor } A = \frac{(\text{Payload} \times \text{air speed}) \text{ train.}}{(\text{Payload} \times \text{air speed}) \text{ tug.}}$$

$$\text{Efficiency factor } E = \frac{(\text{Payload} \times \text{range/fuel}) \text{ for train.}}{(\text{Payload} \times \text{range/fuel}) \text{ for tug.}}$$

The other factors P, A and E do not vary much with range and the following gives average values up to 800 miles:—

	Tug alone.	+ 1 G.	+ 2 G.	+ 3 G.
P	1	2.2	3·4	4·5
A	1	1.9	2.3	2·7
E	1	1.4	1.6	1.6

(4) It will be noted that for a given range both factors A and E are increased for the train in spite of the decreased air speed and increased fuel consumption. This is due to the large increase in payload (factor P) which overshadows everything else.

(5) This appears at first sight to favour the general utilisation of glider trains for transport work. Difficulties in take-off combined with low rate of climb and horizontal speed added to the relatively restricted range would, however, put up the operative costs very considerably. This will be considered in a subsequent paper by the authors. For military purposes, however, when troops or supplies have to be transported over relatively short distances, the glider train has already proved of enormous advantage.

Future developments will lie in the employment of subsidiary tugs so that the train can be fixed up in the air at a reasonable altitude, refuelling of the tug in the air and the provision of specialised tug engines which are adequately cooled at relatively low air speeds.

Design of Cross Flow Heat Exchangers from Tested Core Sections. (P. A. Scherer, J.S.A.E., Vol. 50, No. 12, Dec., 1942, pp. 542-548.) (114/10 U.S.A.)

Although this paper deals with the general problems of heat exchangers, it is of special interest for the design of intercoolers in the supercharger circuit of aero engines. It is assumed that experimental data on a core section are available. Such data will usually consist of the following :—

(1) Pressure drop for coolant and supercharger air on a mass flow basis.
(2) " Effectiveness " of intercooler on a mass flow basis with coolant air pressure drop as parameter.

The " effectiveness " is defined as :—

$$\frac{\text{Supercharger Temp. in—Supercharger Temp. out}}{\text{Supercharger Temp. in—Coolant Temp. in}}$$

and this coefficient increases with coolant air pressure drop but decreases with increase in mass flow. An average value is about .5, but the coefficient may range from .4 to .7 depending on circumstances.

The full scale intercooler will have to fulfil certain requirements which may including the following :—

Mass flow, pressure drop, absolute pressure, temperature at entry and exit and length of flow.

The author shows how these requirements can be correlated with the experimental data, making use of the Nusselt equation for heat transfer in cross flow.

A worked out example illustrates the method, the following data being given:

(1) Dimensions of intercooler.
(2) Supercharger circuit.
    Mass flow rate.
    Entry temperature.
    Entry pressure.

    Coolant circuit.
    Entry temperature.
    Entry pressure.
    Pressure drop.

Using experimental data on the same type of core but different dimensions, the author obtains the following performance data for this intercooler :—

Supercharger circuit.
Exit temperature.
Pressure drop.

Coolant circuit.

Exit temperature.
Mass flow rate.

The Effect of Environment on Aircraft Engine Design and Performance. (L. T. Miller, S.A.E. National Aeronautics Meeting, April 8-9, 1943.) (Preprint available.) (114/11 U.S.A.)

The performance of an internal combustion engine operating at a given r.p.m. depends on a variety of factors of which the chief are the intake and exhaust conditions and the temperature of the engine parts.

Bench tests rarely reproduce conditions as they exist when the engine is operated in an aircraft and may be very misleading when comparing engines of different types. What interests the user is the net thrust horse-power available after the drag (including cooling) and propeller losses have been allowed for. At the same time the weight of the complete installation should be a minimum, and the specific fuel consumption low.

In the past there has been a tendency to judge the possibilities of aircraft engines on test bench performance, it being left to the aircraft designer to provide a suitable mounting and arrange for adequate cooling. Under such conditions the benefits of an inherently light engine structure were often lost by clumsy installation and cooling difficulties. Nowadays, the concept of the aircraft power plant is gaining ground, the unit being designed from the start to function under flight conditions, with all the necessary auxiliaries in position. Light weight of the engine as such, although still of course desirable, is not the single criterion. What matters is the net thrust h.p. delivered per unit weight of the complete installation. Thus a reduction in cooling drag or weight and drag of engine mounting may easily overbalance a heavier specific weight based on test bench results.

In addition, however, to a higher power/weight ratio a low specific fuel consumption is also of importance, since it largely determines the amount of pay load that can be carried. According to the author, much still remains to be done in reducing carburettor metering tolerances and preventing fuel wastage.

With the large power outputs at present in use, even a small percentage saving represents a considerable increase in weight carrying capacity.

Operating Characteristics of Lubrication Systems for an Aircraft Power Plant Installation Under Simulated Altitude Conditions. (Sea level to 40,000 feet.) (H. D. Scrymgeour, S.A.E. National Aeronautics Meeting, April 8-9, 1943.) (Preprint available.) (114/12 U.S.A.)

Following a suggestion by the N.A.C.A. that all new lubricating systems should be bench tested under simulated altitude conditions for foaming and pump capacities, Consolidated Aircraft built a mock up of such a system intended for a new bomber. The system consisted of the following elements:—

(1) Engine sump with one gear type of oil pump delivering 20 gallons per minute (electrically driven).

(2) One gear pump supplying 10 g.p.m. (electrically driven, simulating cabin supercharger circuit).

(3) One gear pump supplying 1.5 g.p.m. (electrically driven simulating exhaust turbine circuit).

(4) An oil tank of approximately the same size as used in the plane provided with an observation window and electrical heaters.

(5) An oil flow measuring tank.

(6) An auxiliary vacuum pump connected to main tank, measuring tank and engine pump.

The two auxiliary pumps are arranged in parallel and take their supply from the main feed line between tank and engine pump (before engine pump entry).

Lengths of glass piping for visual examination of the oil flow are inserted at the suction entry of each of the pumps, in the main suction pipe below oil tank and in the common delivery pipe before entry into oil tank. Care was taken to copy the proposed dimensions and lay-out of all the suction pipes with mock up. (No attempt was made to obtain similarity on the delivery side, it being assumed that the pump characteristics are entirely determined by conditions at entry.)

The tests were run at a series of constant oil delivery temperatures (85°C., 95° and 75° C. respectively) at gradual increasing vacuum, the pumps having been previously adjusted to give the required deliveries at atmospheric pressure. This adjustment was not changed during the tests.

Reduction of the air pressure causes a liberation of air bubbles in the oil and at very low pressures there is also a tendency to foam.

With the delivery at the relatively low temperature of 75°C., observation showed that some solid oil was present in all the pipe lines up to 40,000 ft.

At the high temperature (95°C.), solid oil disappeared at 35,000 ft. in the return line to the tank and at 40,000 ft. in the supply line just out of the tank and the line to the turbo pump.

The mixture of oil, foam and air can be handled by the engine pump to ensure adequate lubrication under all conditions up to 40,000 ft.

The cabin supercharger oil supply on the other hand was only just sufficient at 40,000 ft., whilst the turbo oil supply was definitely below requirement for the cold oil at 40,000 ft. It is interesting to note that the presence of as little as 1.5 per cent. of water (by volume) increased the foaming considerably, especially at the higher temperature, and this caused the turbo pump to fail at already 15,000 ft.

It is proposed for this reason to increase the oil supply to each of those auxiliaries when the system is installed in an aircraft.

Progress Report on Cold Starting Data of the Automobile Diesel Fuel Division of the Co-operative Fuel Research Committee. (F. C. Burk, S.A.E. War Engg. Production Meeting, Jan. 11-15, 1943.) (Preprint available.) (114/13 U.S.A.)

The experiments were carried out on a 6 cylinder 4 cycle Lanova type combustion chamber Diesel which was installed in a cold chamber and could be cooled down to 30°F. Lubricating oil SAE 30 was used in all the tests. Starting was considered to be satisfactory when the engine continued to run after a period of 30 seconds cranking at a speed varying between 280 and 380 r.p.m. (the lower values corresponding to the lower temperatures).

The five fuels tested had the following characteristics:—

Fuel Ref. No.	Cetane No.	API gravity.	Viscosity SSU.	I.H.P.	A.S.T.M. Distillation °F. 10 %.	50 %.	90 %.	E.P.
1	37·5	30·7	36.1	382	444	508	604	669
4	46.6	44·7	30·4	311	347	394	491	543
5	44·3	28.3	49.8	452	528	608	691	730
6	50·5	34.8	37.0	484	504	516	536	558
7	45·2	34·5	35·2	333	399	514	639	700

The low temperature starting temperature together with cranking times are given below:—

Fuel Ref.	Starting temp. °F. 30 sec. motoring.	70 sec. motoring.
1	58°	52
4	41	33
5	50	38
6	37	31
7	49	40

It will be noted that the starting temperatures vary inversely as the Cetane Numbers of the fuels tested, whilst the variation with other properties (density, viscosity boiling range) did not have any apparent influence on the starting.

Further tests are, however, required before the conclusion can be accepted generally. These tests should include other types of engines, both with and without auxiliary starting devices and cover lower temperatures. Under more strenuous conditions, as the temperature approaches the pour point of the fuel, a relationship between fuel viscosity and ease of starting would be expected. If the four variables, Cetane No., gravity, viscosity and volubility are accepted as possible factors influencing cold starting, the fuels should be selected so that only one of these factors is varied at a time. It was found impossible to do this without the use of special blends or dopes which were excluded from the present programme of tests.

Cold Starting Tests on Diesel Engines. (H. R. Porter, Paper read at War Engineering Production Meeting of the S.A.E., Jan. 11 to 15, 1943.) (114/14 U.S.A.)

Conclusions.

1. The required cranking time is decreased with increase in cranking speed and ambient temperature and decrease in altitude. The lowest ambient temperature investigated was of the order of 20°F.

2. The starting performance of undoped fuels is predicted by the delay cetane number. With increased cetane number, greater ease of starting is obtained. However, with doped fuels, the delay cetane number may or may not predict the starting performance depending on the particular dope used. Thus ethyl nitrate will improve the cetane number but does not affect the starting performance. The addition, however, of bromo cyclo hexane to a fuel doped with ethyl nitrate gives a starting performance in line with the cetane rating although bromo cyclo hexane by itself does not improve the starting.

Chloropicrin, ampl nitrate, sulphur and ethyl disulfide when added to the fuels give a starting performance in line with the new cetane rating.

3. As indicated by tests on one make of engine, laboratory results may be used to predict service starting performance.

4. Various substances, including chlorine, hydrogen sulfide, amyl nitrate ethyl disulfide, and chloropicrin, are effective in aiding starting when added to the intake air. This finding suggests the use of an auxiliary device, especially designed for the purpose, for aiding in starting under severe weather conditions. However, the effect of such dopes on engine maintenance should first be determined.

Cranking Power and Torque Requirements of Diesel Engines at Sub-zero Temperature. (H. L. Knudsen, S.A.E. War Engg. Production Meeting, Jan. 11-15, 1943.) (Preprint available.) (114/15 U.S.A.)

The experiments were carried out on a 6 cylinder Cummins Diesel of 672 c.i. displacement, the friction h.p. being determined at various speeds and tempera-

tures with three different kinds of lubricating oil (Grade SAE 30, SAE 10, SAE 10 + 30 per cent. paraffin).

The following table gives the motoring h.p. five seconds after starting from rest, the engine temperature being as indicated:—

Temp.	−30 °F.	0 °F.	+30 °F.	Oil.
200 r.p.m.				
Motoring h.p.	52	26	13	SAE 30
	33	15	6	SAE 10
	10	6	3	SAE 10 + paraffin
100 r.p.m.				
Motoring h.p.	30	14	5	SAE 30
	22	7	2	SAE 10
	5	2	½	SAE 10 + paraffin

These figures apply to motoring with compression release. If the compression is effective, the motoring h.p. is increased by about 2 h.p. at 200 r.p.m. and 1 h.p. at 100 r.p.m., irrespective of temperature.

Immediately on starting, the motoring h.p. is appreciably higher than the figure given in the table. There is a subsequent rapid decrease, a steady state being reached after about five minutes motoring. This steady motoring h.p. is only about ½ to ¼ of the original value, except in the case of the paraffin mixture which shows a much smaller effect, with time especially at the higher temperatures.

Since motoring speeds of at least 100 r.p.m. are necessary for starting, it is clear that the power requirements for cranking at such low temperatures cannot be met by a starting motor circuit of reasonable size and weight even if cold resisting oils of the type SAE 10 are employed.

It appears at first sight that the paraffin/oil mixture presents a simple solution of the problem. Unfortunately this mixture is unsuitable for operation at higher temperatures. The difficulty could be met by substituting petrol for the paraffin, since most of the former would evaporate and leave a lubricant of proper viscosity at operating temperatures. The objection to this is the need for a fresh supply of diluent which must be added while the engine is still operating to ensure a proper distribution of the lubricant in readiness for the next cold start. In the author's opinion this presents a tedious and expensive operation, which might, moreover, damage the engine unless carried out very carefully. For this reason the author suggests the provision of an electrical oil immersion heater as the simplest solution of the cold starting problem. A similar heater is also recommended for the battery, so as to reduce its internal resistance and obtain the normal discharge current.

Effect of Injection Pump on Cold Starting. (M. M. Roensch, Paper read at War Engineering Production Meeting of the S.A.E., Jan. 11-15, 1943.) (114/16 U.S.A.)

Of the many problems to be solved during the development of a Diesel engine for use in trucks, cold starting is by no means the least. During the investigation of some of the variables affecting the starting characteristics, it was indicated that there is no satisfactory substitute for the application of heat prior to cranking. Without a good heater, reliable starting at temperatures below 10°F. is impossible on an engine of this type.

This paper covers the results of a series of cold room tests (−10°F.) to determine the effect on cold starting of the following factors:—

A. The quantity of fuel injected at cranking speed.

B. Two types of injection pumps.

The engine was fitted with a standard 4,000 watt air intake heater which was switched on one minute before the attempted start and left on during the subsequent runs.

The results may be summarized as follows:—

1. For optimum starting, particularly at low cranking speeds, 75 per cent. to 85 per cent. more fuel is required than that delivered by the pump for maximum power, thus indicating the desirability of having some means of increasing fuel delivery for starting purposes.
2. Fuel pumps must have good distribution, even at low cranking speeds, for unless each cylinder will contribute its best power under these conditions cranking speeds will not increase as rapidly as they should and therefore a longer starting time results.

Piston Ring Scuffing as a Criterion of Oil Performance. (G. H. Keller, S.A.E. War Engg. Production Meeting, Jan. 11-15, 1943.) (Preprint available.) (114/17 U.S.A.)

The author confirms the opinion now fairly generally held that laboratory tests are useless for determining the lubricating qualities of an oil employed in a modern big duty aircraft engine. The only satisfactory basis for comparison is the mechanical condition of the engine following a power run under standardised conditions. Since the piston rings offer a difficult lubrication problem, the author proposes to use their condition as a criterion for rating the oil, and for this purpose he devised specially severe test conditions high barrel temperature so that variations in oil characteristics will show up within a period of five hours.

All the tests were run on Wright Cyclone C9GC single cylinder fitted with the normal type of six ring piston. Before each test the barrel was carefully lapped, using an old piston and rings so as to ensure a constant surface finish of the cylinder walls. The lubricating oil is supplied to the cylinder by two jets situated on the cylinder skirt on the thrust and anti-thrust sides respectively. Both these jets direct the oil as a solid stream on the underside of the piston, the walls being lubricated by splash from the underside of the piston. Oil thrown off from the crankpin was prevented from entering the cylinder by means of a close fitting baffle fitted with a slot just large enough to clear the connecting rod.

The engine cam and crankcase formed independent wet sumps from which the oil drained into a cooler and was then circulated by means of a pump to the crankshaft, the two oil jets and camshaft, the rate of flow being measured by sharp edged orifices in the respective pipe lines. The total quantity of oil in circulation was originally two gallons in each case, the oil consumption being measured by weighing the residue after the test. Gauges in the cam and crankcase enabled the oil level to be watched, and the test was stopped should the level fall below a certain minimum indicating abnormal oil consumption.

The normal duration of the test run was five hours, prior to which the engine was run in for a period of three hours at gradually increasing load up to a maximum of 134 b.h.p. at 2,500 r.p.m. This was followed by a five hour run at cruising power (72 b.h.p. at 2,000 r.p.m.) after which the oil system was drained and replenished with the test oil.

During the preliminary runs the following factors were maintained constant:—

Oil inlet temperature	180-190°F.
Crankshaft supply	6.5 lb./min. at 2,000 r.p.m.
Head temperature (rear spark plug gasket)	375-385°F.
Cylinder base temperature	265-285°F.
Oil flow to cylinder jets	7.5-8.5 lb./minute

After the preliminary run, the cylinder barrel was wrapped round with an aluminium radiation shield and the test proper run under the following conditions after a preliminary warming up period of 30 minutes:—

Time	5 hours
R.P.M.	2,500
B.H.P.	134
Cylinder head temperature	400-410°F.
Cylinder base temperature	400-410°F.
Mid-barrel temperature	480-490°F. (average of 6 couples)
Crankshaft supply	5.5-6.5 lb./minute
Oil to cylinder jets	1.25-1.5 lb./minute

The oil inlet temperature and specific fuel consumption were kept at the same values as during the preliminary runs (180°-190°F. and .70-.75 lb. per b.h.p./hour respectively).

The fuel used has an octane rating corresponding to iso-octane + .8 cc. TEL and no trace of detonation was observed.

The relative merits of the oils under test were determined by the following factors:—

(1) Condition of rings and piston.
(2) Oil consumption.
(3) Blow-by.

The author claims that the method gives consistent results and is sufficiently arduous to show up marked difference in the behaviour of various types of high class oils in a relatively short running period. Moreover the grading of the oils is in agreement with that based on the much less strenuous conditions of practice necessitating running periods of several hundred hours before marked differences can be established.

Altogether five lubricating oils were tested by the author. In no case did the laboratory grading (viscosity under oxidation factor, etc.) agree with that of the engine tests.

Finishes for Plywood in the Aircraft Industry (Types and Application). (R. B. Anderson, A.S.M.E. Preprint, April 26-28, 1943.) (114/18 U.S.A.)

The major requirements of a finishing system of the direct coating type for plywood aircraft surfaces are presented. These include moisture resistance, durability to weathering and hard usage, weight factors, application in the aeroplane factory, refinishing in the field, and the need for film smoothness. A review of the various types of finishes is given, covering both the development and service stages. These types can be classified as:—

(a) Cellulose.
(b) Alkyd.
(c) Phenolic.

Of these the phenolic type appears to be the most promising.

The cellulose type is easy to apply and dries quickly. It has, however, a poor moisture resistance and tends to crack and is considered unsatisfactory by the author.

Alkyd type finishes are relatively new and more experience in the field will be required before a definite judgment can be passed. Its moisture resistance appears, however, to be inadequate. The methods of finish applications are considered together with some of the precautions which must be considered.

Problems Affecting the Use of Wood in Aircraft. (R. W. Hess, A.S.M.E. Preprint, April 27-28, 1943.) (114/19 U.S.A.)

On the whole, very little has been done by the wood industry so far to develop the permanent acceptance of wood in face of competition with other

materials. Standardization of grade rules and maintenance of low price are not sufficient, bearing in mind the continued and intensive research for improvement in the quality of metal products.

Continued use of wood in aircraft structures and for some other highly stressed applications, in the face of intense competition from other materials, is dependent in part upon the amount of detailed engineering data that is made available in the near future and upon the extent to which the wood materials and wood products are improved in uniformity and quality.

Following is an enumeration of the measures proposed to stimulate wood use in aircraft:—

1. Wood quality improvement.
   a. Segregation of wood (including veneers) into more restricted specific gravity groups.
   b. Reduction of veneer and plywood tolerances.
   c. Complete control of wood moisture content through all stages of manufacture.
2. Basic data analysis.
   a. Study the available strength data of all wood species to determine accurately the various species offering advantages where particular stresses are dominant.
   b. Utilize these woods to obtain greater strength/weight efficiency.
3. Structural design data accumulations.
   a. Conduct the necessary tests to determine the basic structural design data that have not yet been determined for our native wood species. These include Young's moduli (3) shear moduli (3), Poisson's ratios (6), ultimate and yield strengths for various angles to the grain, and typical stress strain curves.
   b. Advance the wood aircraft designs as rapidly as possible, digressing as far from the " conventional " as is necessary to use wood in its most efficient manner.

Theory of the Expanding of Boiler and Condenser Tube Joints Through Rolling. (A. Nadai, A.S.M.E. Preprint, April 26-28, 1943.) (114/20 U.S.A.)

Tubes in industrial water heaters, steam boilers, and condensers of turbines are fitted in the holes of adjoining drums or head plates by expanding the tube ends. These are slightly enlarged by means of small revolving rolls. In one large steam condenser many thousands of such tube joints have to be rolled, and in high-pressure boilers these joints must remain tight under several thousands of pounds pressure at high temperatures. The pressure of the revolving rolls creates a radial plastic distribution of stress in the tube wall and around the hole in the adjoining heavy steel plate. After the tube end has been rolled, a system of residual stresses remains locked up near the joints which is essential for its pressure tightness. These plastic states of stress have been investigated for various types of the stress-strain characteristics of the tube metal and steel of the head plates. Simple rules are used for computing the stresses in a moderately thick-walled tube under external and internal pressure, either in the elastic or in the plastic state of stress.

Creep of Metals at Elevated Temperatures (the Hyperbolic Sine Relation Between Stress and Creep Rate). (P. G. McVetty, A.S.M.E. Meeting, 26-28/4/43.) (Preprint.) (114/21 U.S.A.)

One of the earliest expressions for stress-creep ratio is the Norton formula

$$v = v_1 (\sigma/\sigma_1)^n$$

where

v = creep rate.
σ = applied stress.
v_1, n = constants depending on material and temperature.
σ_1 = arbitrary constant of the dimension of a stress.

This formula is convenient as giving a straight line when plotted on a log basis, but experience has shown that it over-estimates the stress in the lower creep range. As a result of theoretical considerations, Nadai has proposed a hyperbolic law of the form

$$v = v_0 \sin h\ (\sigma/\sigma_0)$$

where v_0 and σ_0 are constants depending on the material and temperature, which have to be determined from creep tests at two temperatures.

A graphical solution for this purpose is described and a chart is given to facilitate the calculation. The hyperbolic formula is especially useful if the experimental points cover the high stress range ($\sim$ 3,000 psi) and extrapolation is required to very low creep rates. Thus in turbine design, the maximum allowable creep is usually of the order of .1 per cent. per 100,000 hrs. or roughly .001 per cent. per 1,000 hrs. (neglecting higher rate of initial creep). Assuming that only test data at 3,000 and 4,000 psi are available, extrapolation by the power series gives a limiting stress of 1,260 psi for the allowable creep for a certain steel. The hyperbolic formula, on the other hand, is within 10 per cent. of the very much lower experimental value of 300 psi.

Comparison with other available experimental data is equally satisfactory, but since accurate figures are only available for a relatively restricted number of materials and temperatures, more data will be required before the hyperbolic law can be accepted generally.

Operating Temperature and Stresses of Aluminium Aircraft Engine Parts. (E. J. Willis and R. G. Anderson, National Aeronautics Meeting, S.A.E., April 8-9, 1943.) (Preprint available.) (114/22 U.S.A.)

Aircraft engines must be designed to give the maximum possible output at the lowest possible weight.

Further improvements must be based on a more accurate knowledge of the thermal and mechanical stresses met with in operation. The authors classify the engine structural parts made of aluminium under the headings of cylinder head, piston and crankcase, and indicate possible lines of development in each class.

As regards the cylinder head, operative temperatures are most conveniently estimated by a Brinell hardness survey, the connection between hardness, temperature and exposure time having been obtained by a previous calibration.

The stresses under which the head operates are partly of the nature of prestresses due to the assembly (shrink fits), and partly cyclic stresses imposed by the combustion cycle and rocker gear operation. Stress concentration because of mating parts or sharp radii are very difficult to allow for. Such concentrations arise specially on the barrel threads and at the top of the barrel. Care should be taken that all threads match correctly at the operating temperature rather than at shrink or room temperature.

The proportion of aluminium head thickness to steel barrel thickness in the vicinity of the joint should be at least in the ratio of 4.2/1. The connection to the exhaust pipe should be in the form of a flange, and studs in the aluminium keeping the exhaust pipe as flexible as possible. Since the cylinder heads flex considerably in relation to each other during actual operation, a flexible joint is necessary.

In the case of liquid cooled cylinders, the head jacket must be made of very ductile material, otherwise the first explosion which the head undergoes may strain the jacket material past its yield point at point of stress concentration and then produce cylinder distortion.

Pistons.

Operating temperatures are again best obtained by a Brinell hardness survey, whilst the corresponding strain distribution are given by a brittle lacquer method.

The strength of the wrist pin and connecting rod have a considerable effect on the piston stresses. The limiting load which the piston will support is determined by the stress concentrating at the inside of the wrist pin boss brought about either by inward deflection of the piston crown or bending of the wrist pin. Short pins of large diameter, in spite of the higher load per unit projected area, are therefore preferable.

Ringland distortion under load is also of great importance. This can be readily measured at room temperature and will generally be slightly less at the working temperature due to redistribution of stress. Most of the stresses in a piston are of a fatigue nature and care must be taken not to exceed the fatigue limit at the operative temperature.

A simple form of testing machine is described in which the full scale temperature distribution in the piston can be imitated, whilst cyclic loads up to 100,000 lbs. can be applied at a frequency of 1,300 cycles/sec. The prevention of piston distortion appears to be the foundation of a successful design.

Crankcase.

The main difficulty in light alloy crankcase is the provision of holding down studs for the cylinder barrel. Care should be taken that any bending stresses in the crankcase do not pass the section in which the studs are placed. Usually the stress distribution in the studs varies considerably. A ring nut for holding down the cylinder, such as used on the German D 601 engines, gives a much more uniform distribution.

Caution in the use of ribs in crankcases cannot be too highly emphasised. Thin round topped ribs in conjunction with a diaphragm should not be used. A better use of the metal results if only ribs are used in the construction, since these can now be made broader and stronger.

Elevated Temperature Ageing of 24S Aluminium Alloy. (P. P. Mozley, J. Aeron. Science, Vol. 10, No. 6, June, 1943, pp. 180-184.) (114/23 U.S.A.)

The ageing of strong Al. alloys at elevated temperatures is not a new process and the possible improvements in physical propertis have been frequently studied.

The fear of corrosion difficulties and lack of precise data on the heat treatment have delayed application of the process.

For this reason the author carried out detailed tests on 24 S alloy as commonly employed in aircraft construction. It appears that optimum results are obtained for this alloy when ageing at 375°F. for eight hours. This treatment will raise the yield point by about 50 per cent. and the ultimate tensile by 10 per cent., whilst the original elongation is approximately halved.

The maximum physical properties obtainable by ageing depends to a considerable extent on the inherent stress distribution due to cold working after solution heat treatment but prior to ageing. For consistent results the amount of cold working should correspond approximately to that required to produce a 1 per cent. permanent set by stretching or 2 per cent. reduction in thickness by rolling.

The corrosion resistance of aluminium covered sheet of 24 S alloy is not seriously affected by the ageing at elevated temperature, provided the thickness of the sheet is greater than .032 in.

The corrosion resistance of bare 24 S alloy is, however, appreciably lowered and elevated temperature ageing in thicknesses below 3-16th in. is not recommended because of the increased tendency of inter-crystalline corrosion.

It will thus be noted that hot temperature ageing of 24 S alloy presents important advantages without any risks of excessive corrosion. The only drawback is the need for a close control of the degree of prior cold-working if consistent results are to be obtained.

Significance of the Secant and Tangent Moduli of Elasticity in Structural Design. (D. S. Wolford, J. of Aeron. Sciences, Vol. 10, No. 6, June, 1943, pp. 169-179.) (114/24 U.S.A.)

The author deals with the problem of designing beams and columns of structural materials that have no well defined yield point and which must be used above their proportional limit.

Under these conditions we have to differentiate between three kinds of modulus of elasticity.

E_o = Young's modulus (lb. psi) = stress/strain under initial conditions (proportionality).

E_s = secant modulus = stress/strain under actual conditions.

E_t = tangent modulus = slope of stress/strain curve at a particular load under actual conditions.

As is well known, the buckling load P of a freely supported uniform strut is given by the Euler equation $P=\pi^2EI/l^2$ on the assumption that the elastic limit is not exceeded, *i.e.*, $E=E_o$.

Putting $J=i^2F$ where i = radius of gyration of section and $\lambda=L/i$ = slenderness ratio

$$P=\pi^2E_oF/\lambda^2$$

$$i.e.,\ P/F = \text{buckling stress} = \pi^2E_o/\lambda^2.$$

As λ decreases, the buckling stress therefore would increase indefinitely (Euler hyperbola).

As a matter of fact, E_o will only remain constant till the stress has risen to the proportionality limit. If buckling takes place at this point, the compression stresses along the inner (concave) side of the strut will increase according to the tangent modulus of the section. The outer (stretched fibres), however, will have their compression reduced and will thus operate under E_o conditions. As a result, the stress distribution is no longer symmetrical about the neutral axis of the section and the strut behaves as if it possessed a so-called " reduced " modulus which is a function of E_o and E_t.

In the case of a solid rectangular section

$$E_r=4E_tE_o/(\sqrt{E_o}+\sqrt{E_t})^2 \quad . \quad . \quad . \quad . \quad (1)$$

whilst for an idealised H section (infinitely thin flanges and no web)

$$E_r=2E_oE_t/(E_o+E_t) \quad . \quad . \quad . \quad . \quad . \quad (2)$$

The buckling load of short struts is then given by

$$\sigma_B=\pi^2E_r/\lambda^2$$

where E_r = reduced modulus of section.

So far E_r has only been worked out for a few sections and in view of the large number of different sections employed in practice, the labour involved to cover the whole range would be prohibitive.

The question naturally arises whether some simpler criterion for a material suitability for short columns might be devised.

For this purpose the author carried out complete tension and compression tests on two tempers of 25 gauge ($\sim .02''$), type 301 (17-7) high tensile stainless steels. These tests were carried out both on longitudinal and transverse speci-

mens, both as cold rolled and after stress relieving. Stress-strain, tangent and secant modulus data were obtained in curve form.

Next, column tests were made on corrugated sheet of the same material.

The specimen varied in slenderness ratio from approximately 30 to 300 and were loaded as columns with knife edge end conditions.

The curves of buckling stress against slenderness ratio were found to be in good agreement with Euler curves based on tangent modulus, showing that for this type of section, at any rate, E_t forms a satisfactory criterion, provided premature crippling due to local unstability is avoided.

The author also shows that for hollow sections with most of the material remote from the neutral axis, E_r under pure bending is identical with the secant modulus E_s. A knowledge of the tangent and secant modulus will thus enable the designer to tackle short column problems with a certain amount of confidence.

It must, however, not be forgotten that the crippling loads given by the formulæ are upper values which are only approached if premature failure due to local instability is prevented, *i.e.*, the failure must be of the Euler type.

Behaviour of Plywood Under Repeated Stresses. (A. G. Dietz and H. Grinsfelder, Trans. A.S.M.E., Vol. 65, No. 3, April, 1943, pp. 187-191.) (114/25 U.S.A.)

The material employed in these tests was aircraft quality birch veneer, 1-16th in. thick. Two kinds of adhesives were employed, the veneer being laid up and bonded as follows:—

a. Phenolic resin film: Two-ply laminated, 3-ply laminated, 3-ply plywood.

b. Urea resin solution: Three-ply plywood.

Both laminated and standard plywood construction were investigated under bending fatigue. Laminated wood (constant grain direction) resembles solid wood in that the bending stress varies uniformly across the section with a maximum shear stress at the centre. In the case of 3-ply plywood, however (varying grain direction) the bending stress is concentrated in the two outer layers where the grain is parallel to the axis, whilst the shear stress reaches a maximum at the glue joints.

Various types of specimen were tested to determine the steps which would most consistently yield fractures free of split and would at the same time provide constant bending stress over a representative cantilever length.

This was finally achieved by adopting a tapered plan form for the specimen, the wider end piece being rigidly clamped whilst the narrower head was attached to the connecting rod of the reciprocating test machine operating at 1,750 r.p.m. Exact dimensions of the test specimen are not given.

To provide standards of comparison, static bending and tension specimen were cut from each sheet of material adjacent to the points from which the fatigue specimens were cut. The static bending specimens were one inch wide and were tested on a span 16 to 20 times the depth of the specimen. Glue lime shear tests were carried out in the standard manner from one inch wide specimen cut from the fatigue specimen after failure and from the bending control specimen. Each fatigue specimen was first calibrated by loading the free end and obtaining a load deflection curve. From this the modulus of elasticity and the stress corresponding to a given deflection were calculated.

The throw of the connecting rod was then adjusted to produce a stress equal to a given fraction of the ultimate static fracture and the number of stress reversals to crack the specimen was noted.

The following represents a summary of the results:—

Statistics Tests (Average Results).

Material.	Density.	Moisture content.	Ultimate.	Prop. limit.	$E \times 10^6$
Phenolic film					
2-ply lam. ...	.67	7-9 %	25,000 lb. psi.	16,500 psi.	2.4 psi.
3-ply lam. ...	.68	,,	23,400	15,000	2.1
3-ply plywood ...	.72	,,	20,600	13,500	2.1
Urea formaldehyde					
3-ply plywood ...	.66	,,	17,400	12,000	2.0

Dynamic Test $R = \frac{\text{Repeated stress modulus of rupture}}{\text{Static modulus of rupture}}$ (Average results)

Material.	R for cycles. 500	10^4	10^6	2×10^6
Phenolic film				
2-ply lam.	.5	.41	.28	.25
3-ply lam.	.48	.40	.26	.24
3-ply plywood	.54	.44	.30	.25
Urea formaldehyde				
3-ply plywood	.52	.42	.27	.24

Periodic examination of the specimen during the test runs revealed little tendency for the board to fail and the veneers to separate. After the outer plies had cracked through to the glue line, delamination did occur in a few instances. This tendency was somewhat more prevalent in the plywood than in the laminated materials.

It will be noted that irrespective of construction and type of glue, a life of at least 2×10^6 reversals can be expected, provided the repeated stress does not exceed 25 per cent. of the ultimate static value.

The actual repeated stress value for this life will, however, be highest for the two-ply laminated wood since it possesses the highest ultimate static stress.

High Density Laminated Plywood. (M. Finlayson, Trans. A.S.M.E., Vol. 65, No. 3, April, 1943, pp. 193-199.) (114/26 U.S.A.)

In normal plywood, subdivision and reassembly add little to the aggregate strength of the resultant material. The assembly, however, ensures the absence of local flaws and crooked grain and thus represents the best that can be obtained with wood of a given type. It appears that the resin, as used in normal manufacture, plays only in a minor part in improving the mechanical properties.

A large increase in strength of the wood, however, arises if the veneers are densified during assembly by using pressures much higher than are usual in ordinary plywood manufacture. By controlling the pressure, temperature and moisture content during assembly, any degree of densification up to 1.4 can be readily obtained. The thermosetting adhesive cures whilst the wood is in the compressed condition, and if sufficiently thin veneers are used there is practically no spring back after the material has cooled and is removed from the press. The data on strength characteristics presented by the author refer to the so-called unimpregnated type of high density wood, made from 1/32 in. birch veneer using a film type adhesive (Tego bond). The grain direction of all the plies is parallel (laminated wood). The density of the material varied about .8 and 1.3, depending on the manufacturing process adopted. The boards supplied were approximately 1 in. thick.

The tests show that both the tensile and compressive strength varied directly as the density of the material, the resulting mean line passing through the origin.

The strength for weight ratio is thus constant (24,700 psi under tension and 15,000 psi under compression for wood of unit density).

There is thus no inherent advantage on a weight basis on using the heavier wood. The density should, however, not fall below .8 to ensure adequate bonding (film stronger than wood). On a volume basis, however, the higher density wood presents important advantages.

TENSION.—The high density wood has no yield point and can be loaded up to the breaking limit without the appearance of permanent distortion.

If comparison with metals is carried out at the yield point of the latter, high density laminated wood on a weight basis is about six times as strong as low carbon steel and 50 per cent. stronger than Alclad. Even if we compare ultimate strength in each case, the densified wood still heads the list on a weight basis, as is shown in the following table:—

Material.	Density.	Ultimate.	Ultimate/d.
High density wood ...	.8-1.3	depends on d	24,700
Steel, heat treated ...	7·75	175,000	22,600
Al. alloy	2.81	60,000	21,400
Mg. alloy	1.78	43,000	24,200

COMPRESSION.—The high density wood does not show the same superiority over other materials, but is still well up on the list (15,000 psi against 20,700 for Al. alloy).

TORSION.—The ultimate shear strength under torsion is only about 1/9 that of aluminium. The resistance to torsional shock is however about the same. Thus, if internal damping is neglected, the max. shear stress (developed if a circular shaft of radius r is suddenly given an angular velocity w) is given by

$$f = rw\,(Ed)^{\frac{1}{2}}$$

where

E = modulus of rigidity.
d = density.

Using the following values:—

	Aluminium.	High Density Wood.
E	4.2×10^6	$.18 \times 10^6$
d	2.85	·95

$$(Ed)^{\frac{1}{2}} \text{ al.}/(Ed)^{\frac{1}{2}} \text{ wood} = 8.4$$

which is approximately the same as the ratio of the shear strength. The high interval damping of the wood presents an additional advantage since it evens out stress peaks.

EFFECT OF MOISTURE.—Exposure to water vapour and especially immersion water causes a considerable change in thickness and smaller changes in the other dimensions. The dimension in the direction of the grain is scarcely altered, whilst the thickness may increase up to 50 per cent. This increase in thickness is accompanied by an increase in weight of the same order. In spite of these large dimensional changes, there is no tendency to delamination.

High density plywood of the type tested must therefore be thoroughly protected by an imperious coating before it can be utilised under conditions of high humidity.

The material has proved an excellent material for aircraft propellers of large power output, a three-bladed 1,750 h.p. propeller weighing about 300 lb. less than a metal propeller of similar output.

In addition to this saving in weight, the high density wood propeller is less sensitive to notches and dents, and has excellent fatigue resistance and damping characteristics.

It is probable that further extensive uses for this material will be found once the large press equipment required will become more generally available.

Heating Wood with Radio-Frequency Electric Power. (I. P. Taylor, Trans. A.S.M.E., Vol. 65, No. 3, April, 1943, pp. 201-212.) (114/27 U.S.A.).

If an alternating E.M.F. is applied to a perfect condenser, both the current and voltage are permanently out of step by 90° and no power is consumed.

If the dielectric is imperfect (*e.g.*, wood), the circuit behaves as if an "equivalent" resistance R_p were placed in parallel with a perfect condenser of the original capacity. R_p depends on the frequency.

The total current now leads the voltage by less than 90° and has both a resistance and capacity component (i_R and i_C respectively).

The power generated is now given by

$$P = i_R^2 R_p \quad . \quad . \quad . \quad . \quad . \quad . \quad (1)$$

where

$$R_p = 1/2\pi fc \times 1/\cos\theta \quad . \quad . \quad . \quad . \quad . \quad (2)$$

C = capacity of condenser.
f = frequency.
$\cos\theta$ = power factor.

The power factor can easily be measured by means of a special meter. It depends mainly on f and also slightly on the type of wood.

The following table represents average values:—

f	Power factor %.
60 cycles/sec.	.05
10 kc.	.8
10^2 kc.	1.3
10^3 kc.	1.8
10^4 kc.	2.6
10^5 kc.	3.4

If

v = volume of wood in cc.
p = specific heat.
c = density.
Δt = temperature rise in °c.
t = time required (sec.).

Then

$$P = \frac{4.18 \times pc \times \Delta t \times v}{t}$$

The author gives P/v as a function of t and Δt for two values of pc (.25 to .35 respectively).

Most woods fall between these limits. Knowing P and calculating R_p from (2), i_R and hence E can be calculated.

In a worked out example

$P = 6{,}000\ w.$
$C = 150\ \mu\mu$ farads.

If $f = 60$ and power factor .05, $R_p = 354 \times 10^6$ and E becomes 1.46×10^6 volts which is clearly impracticable.

On the other hand, if $f = 10^6$ cycles/sec., $R_p = 20{,}200$ and $E = 11{,}000$ volts.

For a given power output E thus varies inversely as the square root of the frequency, and in order to prevent danger of flash-over, as high a frequency as possible should be used.

The upper limit at present is fixed by tube efficiency by the generator and difficulties of current distribution. At the moment, 10-15,000 volts are usually employed.

The following are some of the advantages claimed for the new process of electric heating.

(1) More uniform heating throughout the mass.
(2) Thick sections can be heated quickly and the process can be adapted to hot glued joints.

(3) Presses for such work are simplified.

(4) Freedom from internal stresses, since uniform temperature implies uniform compression.

Disadvantages are mainly due to the need of adequate electrode insulation on the press, and guarding against flash-over. The author describes various methods of overcoming these difficulties. One obvious solution is to use the electric method outside the press simply to bring the material up to the working temperature. It is then inserted into the press and left to cure under the action of steam alone.

This method is adopted in the manufacture of " compreg " wood laminated propellers.

Limits in the Accuracy of the Determination of the True Vertical in an Aircraft by taking the Average of Readings of the Apparent Vertical. (E. Timmel, L.F.F., Vol. 20, No. 5, 16/6/43, pp. 171-174.) (114/31 Germany.)

Astronomical position finding depends on a knowledge of the true vertical; an error of .1° in the latter causing an uncertainty of 11 km. in the position.

No artificial horizon at present in use claims an accuracy of this order and a pendulum or spirit level is ruled out on account of its readings being seriously affected by even small changes in aircraft speed. As a result, the only practical procedure is to average out the apparent vertical readings over a period of time.

The author considers the errors likely to arise in this case, assuming that the aircraft flies on a straight course and that the disturbance acceleration is less than $g/60$ (error of individual apparent vertical readings not more than 1°).

If

b_v = vertical component of disturbance acceleration.
b_H = horizontal component of disturbance acceleration.
α = deflection of apparent vertical,

we have

$$\tan \alpha = \frac{b_H}{(g + b_v)}$$

$$i.e., \quad \alpha = \frac{b_H}{g} - \frac{(b_H \cdot b_v)}{g^2}$$

The error over a period of time T is thus given by

$$\bar{\alpha} = \left(\frac{1}{T}\right)\int_0^T \left(\frac{b_H}{g}\right) dt - \left(\frac{1}{T}\right)\int_0^T \left(\frac{b_H \cdot b_v}{g^2}\right) dt.$$

The author shows that under the specified conditions, the second integral is less than 1′ and can therefore be neglected.

Disturbances b_H can be classified into two groups.

Group I.—These disturbances are accidental and due to changes in the actual flight path from the ideal (constant direction and speed). They continually vary in amount and direction (gusts, swinging of compass, variation in power output), and the mean value over a length of time approaches zero under automatic pilotage or careful hand control.

The actual error is conveniently divided into a longitudinal and lateral component of the deviation from the true vertical. These are given respectively by

$$\alpha_L \text{ (longitudinal)} = \frac{\Delta v_g}{gT}$$

$$\alpha_Q \text{ (lateral)} = \frac{v_g \Delta X}{gT}$$

where Δv_g = difference in ground speed in km./h. at beginning and end of interval T (minute).

ΔX = angle of rotation (degrees) of flight path tangent from set course over the interval T (minute).

Expressing α in minutes of arc, the above expression becomes

$$\alpha_L = \left(\frac{\Delta v_g}{T}\right) \times 1.71$$

$$\alpha_q = \left(\frac{v_g \Delta X}{T}\right) \times .03$$

Thus for an error of 6′ in α_l, $\Delta v_g/T$ must not exceed about 4. For a similar error in α_q, $v_g \times (\Delta X/T)$ must not exceed 200, *i.e.*, at 500 km./h., $\Delta X/T$ must not exceed .4° if the average is taken over one minute.

NOTE.—The above expression for α_q neglects the effect of the rotation of the flight path with respect to the great circle. This will be included in Group II, Section 2, below.

GROUP II.—Disturbances under this heading are not accidental and cannot be eliminated by averaging. They result in a steady deflection of the apparent vertical and may be due to any one of the following causes:—

(1) Coriolis acceleration due to rotation of the earth.
(2) Acceleration due to curvature of loxodrome (constant course).
(3) Changes in the wind velocity.

(1) The horizontal component of the acceleration is given by

$$b_c = 2wv_g \sin \phi,$$

where

v_g = ground speed.
ϕ = latitude.
w = angular velocity of the earth = .25°/minute.

The resultant deflection of the apparent vertical is given by bc/g and necessitates a correction in the altitude of a given star by the amount $bc/g \sin \tau$ where τ is the azimuth. At $v_g = 500$ km./h. and $\phi = 52°$, τ must be less than 60° in order to ensure an error of less than 6′ in the altitude observation.

(2) LOXODROME CURVATURE.—The radius of curvature of the loxodrome corresponding to a given course angle ψ is given by

$$r = R / \sqrt{(1 + \sin^2 \psi \tan^2 \phi)}$$

where

R = radius of earth = 6,370 km.
ϕ = latitude.

Limiting ourselves as before to the horizontal component of the acceleration, the lateral deflection of the apparent vertical is given by

$$\alpha_F = \left(\frac{V_g^2}{R_g}\right) \tan \phi \sin \psi$$

producing an error in the altitude of a given star of the amount $\alpha_F \sin \tau$, where τ is the azimuth. Even under the most unfavourable conditions ($\psi = 90°$) α_F will be less than 4′ at speeds up to 800 km./h.

The loxodrome cuts all meridians at an angle equal to the course ψ.

If, however, the course is set by a magnetic compass, the actual path will deviate from a loxodrome due to changes in the magnetic declination. This will require an additional correction depending on the rate of change of the declination with length of flight path.

The error due to this effect is not likely to exceed 1′ for flights in our latitudes, provided the ground speed is less than 500 km./h. and the rate of change of declination less than 1°/100 km.

(3) CHANGE IN WIND VELOCITY.—If the wind along the course changes in magnitude and direction, the aircraft will be accelerated relatively to the ground. Taken over a longer time interval, these accelerations will act in the same

direction and will therefore not cancel out when taking mean values of the apparent vertical.

The apparent vertical will deflect in the opposite direction to the wind speed by an amount which depends on the ground speed as shown below.

Change in Wind Speed per 100 km. flight path.	V_g (km./h) 300	500	700
1 km./h.	.08′	.13′	.19′
20 km./h.	1.6′	2.6′	3.7′

Under normal conditions the effect is small. Its exact determination will require very accurate weather maps.

Summing up, it appears that averaging the apparent vertical will give results of sufficient accuracy only if the aircraft is flown under very steady conditions (change in ground speed less than 4 km./h., course deviation less than .4° both taken over an interval of 1 minute). This refers to accidental variations.

The constant errors only become important at high latitudes and speeds above 700 km./h.

Determination of TNT Content of Air. (Z.G.S.S., Vol. 38, No. 2, Feb., 1943, p. 32.) (114/32 Germany.)

The atmosphere of TNT plants contains varying amounts of the chemical, both in the form of dust and vapour. This is injurious to the health of the workers and necessitates accurate control. The German Ministry of Production has issued particulars of a chemical process for the rapid and accurate determination of the amount of nitro-aromatics present in the air.

By means of a large aspirator, 50-100 litre of the air under test are passed through three test tubes in series, each containing 10 cc. of methanol. The internal diameters of the test tubes and connecting tubes are 17 mm. and 5 mm. respectively. The rate of flow is adjusted so that no bubbling over occurs and there is no undue loss of methanol by evaporation. Contents of tubes one and two (originally amounting to 26 cc.) are mixed and shaken up with 2 cc. of 2 per cent. caustic soda solution. After a rest period of 10 minutes the resultant colouration is compared photometrically with a series of standards obtained by dissolving known amounts of TNT in 15 cc. of methanol similarly, treated with caustic soda. The matching must be carried out within 20 minutes of the soda addition, otherwise sedimentation produces error. It is stated that quantities as low as .05 mg. TNT can be detected, corresponding to .5 mg./m.3 if 100 litres are passed.

The third test tube should shown no discolouration and thus acts as a check.

It is pointed out that the colour change is not specific to TNT but can also be used for dinitrotoluol and other nitroaromatics. That colour is a rough indication of the amount of TNT vapour in the air is provided by exposing filter paper previously soaked in a 5 per cent. alcoholic solution of KOH and subsequently dried in a clean atmosphere.

Under the influence of the TNT vapour the test paper is at first coloured pink and then turns brown. The time required to produce a given standard tint is a rough indication of the concentration of the vapour.

Rate of Ice Formation. (A. L. London and R. A. Seban, A.S.M.E. Preprint, April 26-28, 1943.) (114/33 U.S.A.)

The problem of ice formation in liquids in contact with boundaries of various geometries has received but little attention in the literature. Perkeris and Slichter (J. Appl. Phys., Vol. 10, 1939, pp. 135-137) derive an approximate solution for the rate of ice formation on the outside of a cylinder for liquid at the freezing point and infinite surface conductance at the inside cylinder surface. In this solution, the inside surface temperature may be any function of the time. Elmer (Refrig. Engg., Vol. 24, 1932, p. 17) derives a similar expres-

sion for the rate of ice formation on submerged pipes. Other more exact solutions for slab-ice formation are available, but these are of considerable complexity and limited to a constant free-surface temperature. A new consideration of the problem in general with emphasis on approximate solutions of such form as to be readily applied to typical problems therefore seems appropriate.

The objectives of this paper are to accomplish the following:—

1. Describe a general approximate method of analyzing the problem of freezing in liquids bounded by surfaces of various geometries. "Freezing" is hereafter called "ice formation" but the generality of the method will be apparent.

2. Present solutions for the rate of ice formation for boundary geometries which are of significance in applications, i.e., cylinders, spheres, plane surfaces. These solutions are presented algebraically and graphically and are expressed in terms of dimensionless variables.

3. Estimate the degree of approximation of these solutions.

4. Illustrate the application of the approximate solutions by specific applications in ice manufacture and quick freezing of food products.

The results are stated to be in good agreement with practice.

Limits of Human Heat Regulation. (L. H. Newburgh, L. P. Herrington and A. P. Gagge, J. Aeron. Sci., Vol. 10, No. 6, June, 1943, pp. 197-199.) (114/34 U.S.A.)

The human organism is provided with a complicated mechanism which tends to keep the body temperature constant in spite of the varying production of internal heat or changes in the outside temperature.

Under comfortable conditions, the individual loses heat from the surface of the body at the same rate it is produced internally. The external loss is due to radiation, conduction, convection and evaporation of water and will depend on the skin temperature as well as on the humidity and temperature of the surrounding air. When the skin temperature is equal to the air temperature, heat can only be lost by the evaporation of water (sweat) and this is severely restricted if the relative humidity is high (moist desert heat). Under such circumstances the balance is upset and physical work must be restricted to the utmost if fatal results are to be avoided. If, however, the relative humidity is not above 20 per cent. the usual non-combatant field duties can be carried out for eight hours daily at air temperature up to 125°F. Under these conditions the individual loses about 1 litre of sweat per hour (NaCl content 2 gm. per litre).

The extra-cellular fluid in the body (from which the sweat is derived) contains about 8 gm. of NaCl per litre of water and this salinity must be maintained over relatively close limits for proper functioning of the organism.

Heavy sweating thus not only reduces the total amount of extra-cellular fluid but also affects its composition. Under these conditions it is thus not only necessary to have adequate supplies of drinking water but additional salt must be administered.

Whilst sweating provides an effective method for preventing an undue rise in skin temperature, the corresponding protective mechanism against cold appears much less efficient. There appears to be no automatic increase in the internal heat production of the body to prevent progressive cooling. Shivering only provides a moderate relief and the individual is forced to undergo strenuous exercise combined with adequate clothing if the effect of cold is to be resisted.

In this connection it is important to note that even the warmest unheated flying clothing will not prevent a gradual drop in body temperature when exposed to temperatures below 30°F. Extreme discomfort arises when the skin temperature falls from its normal value of 93°F. to 80°F. on the trunk and 40°F. at the

toes. At an ambient temperature of 30°F. these dangerous limits are reached in 20 hrs. and 7 hrs. respectively, whilst at -30°F. the period is reduced to about 3 hrs.

On account of the cramped quarters in an aircraft, adequate remedial exercises are difficult and often impossible for certain members of the crew.

Although electrically heated clothing appears to form an ideal solution, most pilots have an inherent objection to this method (fear of burns?). In addition, it suffers from the drawback of constituting a heavy drain on the electric power supply.

A natural line of development appears to be an increase in the heat insulation of the clothing. This cannot be done by an increase in the thickness of the fabric already in use, since the clothing is already so heavy and bulky that it reduces agility and very markedly becomes a serious risk when effecting an emergency landing on water.

The authors are of the opinion, however, that it should be possible to develop a fabric of reduced thermal conductivity without increase in weight, and research in this direction is strongly recommended.

American Lease Lend Report. (Inter. Avia., No. 869-870, 18/5/43, pp. 18-19.) (114/35 U.S.A.)

The report covers the period 11.3.41 to 1.4.43.

The total aid given by the U.S.A. over this period to its allies amounted to 10.3×10^9 dollars, of which 82 per cent. represented goods (munitions, industrial supplies, food) whilst the remaining 18 per cent. covered services rendered (shipping, ship repairs, training, etc). Of the goods supplied, 55 per cent. have been munitions and 15 per cent. food. Nearly one-third of the munitions were represented by aircraft (1.4×10^9 dollars) over the first three months of this year, the shipment of lease-lend goods was apportioned as follows:—

Great Britain	38 per cent.
Russia	31 per cent.
Africa and Middle East	16 per cent.
Far East	14 per cent.
Other areas	1 per cent.

The total aid rendered over the period under consideration represents about 13 per cent. of the total war expenditure by the U.S.A. over the same period.

Lend-lease and direct purchase of combat aircraft by America's allies have accounted for about one-third of the total American production.

LIST OF SELECTED TRANSLATIONS.

No. 60.

NOTE.—Applications for the loan of copies of translations mentioned below should be addressed to the Secretary (R.T.P.3), Ministry of Aircraft Production, and not to the Royal Aeronautical Society. Copies will be loaned as far as availability of stocks permits. Suggestions concerning new translations will be considered in relation to general interest and facilities available.

Lists of selected translations have appeared in this publication since September, 1938.

AERO AND HYDRODYNAMICS.

TRANSLATION NUMBER AND AUTHOR.		TITLE AND REFERENCE.
1819	Ackeret, J. ... Pfenninger, W.	*Prevention of Turbulent Boundary Layers of Suction.* (Die Naturwissenschaften, Vol. 29, No. 41, 10/10/41, pp. 622-623.)
1825	Kircheman, D. Vandrey, F.	*The Influence of the Nozzle on Resistance Measurements in the Free Jet—II.* (Z.A.M.M., Vol. 22, No. 1, Feb., 1942, pp. 15-22.)
1830	Busemann, A.	*The Resistance Problem in High Speed Flights.* (Schriften d. deutschen Akademie, L.F.F., No. 30, pp. 17-36.)
1832	Guderley, G.	*Regression Edges in Two-Dimensional Compressible Potential Flow.* (Z.A.M.M., Vol. 22, No. 2, June, 1942, pp. 121-126.)
1833	——	*Drag Reduction at High Speeds by Inducing Supersonic Vibrations on the Surface.* (Flugsport, Vol. 34, No. 23, 11/11/42, pp. 165-166, Pat. No. 726,324.)

AIRCRAFT AND ACCESSORIES.

1822	Hulten, N. ...	*Close-Up of the Lagg-3.* (Flug ech Motor, Vol. 21, No. 6-7, March-April, 1943, pp. 25-27 and 21-24.)
1823	Horten, G. ...	*The Horten IV All-Wing Glider.* (Flugsport, Vol. 34, No. 4, 18/2/42, pp. 51-55; and Flugsport, Vol. 34, No. 6, 17/3/42, pp. 63-67.)
1835	Junkers ...	*Jettisoning Containers for Aircraft, in Particular Jettisoning Fuel Tanks.* (Flugsport, Vol. 33, No. 25, 10/12/41, p. 76, Patent No. 713,321.)
1945	Focke-Wulf	*An Aircraft Wing with Slotted Flaps.* (Flugsport, Vol. 34, No. 19, 16/9/42, p. 150, Patent No. 723,748.)
1846	Fieseler ...	*Quick Release Device for Parts, in Particular Jettisoning Undercarriages—Dropped from Aircraft.* (Flugsport, Vol. 34, No. 22, 22/10/42, p. 164, Patent No. 722,027.)
1852	Henschel ...	*Multi-Engined Landplane with Buoyant Cabin.* (Flugsport, Vol. 32, No. 26, 18/12/40, p. 157, Patent No. 699,351.)

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1859	Pintsch	*Retractable Aircraft Searchlight.* (Flugsport, Vol. 32, No. 3, 31/1/40, p. 84, Patent No. 686,222.)
1860	Heinkel, E.	*Lifting Device for Loading Aircraft.* (Flugsport, Vol. 34, No. 26, 23/12/42, pp. 179-180, Patent No. 725,509.)
		MATERIALS AND ELASTICITY.
1826	Theiner, J.	*Strength Characteristics of Woods Used in Captured Russian Aircraft.* (Luftwissen, Vol. 10, No. 4, April, 1943, pp. 103-104.)
1827	Hansen, M. ... ... Seeman, H. J.	*Investigations of Aluminium-Zinc Magnesium Wrought Alloys—II.* (Aluminium, Vol. 22, No. 9, 1940, pp. 442-458.)
1831	Schmidt, R.	*The Bending Fatigue Strength of Machined Crankshafts After Straightening, with Notes on the Stress Distribution, Obtained by Extensometer and X-Ray Diffraction Measurements.* (Luftwissen, Vol. 9, No. 9, Sept., 1942, pp. 263-267.)
		INSTRUMENTS.
1829	Gorner, J.	*High Speed Electro-Magnetic Revolution Counter.* (E.T.Z., Vol. 63, No. 35-36, 10/9/42, p. 416.)
1864	Schmidt, U. ...	*A Fully Automatic Fuel Flow Meter.* (A.T.Z., Vol. 45, No. 24, Dec., 1942, pp. 670-672.)
		WIRELESS AND ELECTRICITY.
1820	——	*Calculation of the Process Responsible for the Excitation of Oscillations on a Valve Connected to a Barkhausen-Kurz Circuit.* (Archiv f. Elekt., Vol. 26, 1932, pp. 841-849.)
1824	Schulze, W. M. N.	*Tropical Climates and Communication Technique.* (Elek. Nachrichtentecknik, Vol. 18, No. 6, 1941, pp. 134-138.) (Translated by A.D.R.D.E.)
		MATHEMATICS.
1821	Buchner, H. ...	*An Approximate Solution of the Ordinary Linear Differential Equation of the First Order.* (Z.A.M.M., Vol. 22, No. 3, June, 1942, pp. 143-152.)

TITLES AND REFERENCES OF ARTICLES AND PAPERS SELECTED FROM PUBLICATIONS REVIEWED IN R.T.P.3.

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THEORY AND PRACTICE OF WARFARE.

General Strategy and Tactics.

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1	10873	G.B.	*The Burman Battle.* (N. Macmillan, Aeronautics, Vol. 8, No. 4, May, 1942, pp. 28-31.)
2	10908	Germany ...	*German Opinions on Aerial Warfare Code Applied to Paratroops and General Use of Parachutes.* (Inter. Avia., No. 859-860, 6/3/43, pp. 1-5.)
3	10946	G.B.	*Mine Sweeper Aircraft (Explodes Magnetic Mines).* (Inter. Avia., No. 861, 17/3/43, p. 8.)
4	10971	G.B.	*Air Force Targets in Sardinia.* (Engineer, Vol. 175, No. 4,560, 4/6/43, pp. 443-445.)
5	10973	G.B.	*Defence of Ships Against Torpedo Attack.* (Engineer, Vol. 175, No. 4,560, 4/6/43, p. 448.)
6	11755	Germany ...	*The Attacks on the Mohne and Eder Damms* (Inter. Avia., No. 869-870, 18/5/43, pp. 22-23.)

Organisation and Training.

7	10654	G.B.	*Night Flying Training.* (Flight, Vol. 43, No. 1,786, 27/5/43, pp. 552-553.)

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8	10671	France ...	*Fighting French Air Transport.* (Aeroplane, Vol. 64, No. 1,668, 14/5/43, p. 574.)
9	10728	India ...	*The Indian Air Force.* (Aeroplane, Vol. 64, No. 1,662, 2/4/43, p. 384.)
10	10740	G.B.	*R.A.F. Silver Jubilee.* (Aeroplane, Vol. 64, No. 1,662, 2/4/43, pp. 385-386.)
11	10741	G.B.	*Genesis of the R.A.F.* (C. G. Grey, Aeroplane, Vol. 64, No. 1,662, 2/4/43, p. 387.)
12	10742	G.B.	*R.A.F. Squadrons*—1918. (Aeroplane, Vol. 64, No. 1,662, 2/4/43, p. 388.)
13	10743	G.B.	*The R.A.F. in the Years Between Two Wars.* (J. M. Spaight, Aeroplane, Vol. 64, No. 1,662, 2/4/43, p. 389.)
14	10745	G.B.	*R.A.F. in the Test of Wars.* (Aeroplane, Vol. 64, No. 1,662, 2/4/43, pp. 392-394.)
15	10746	G.B.	*Twenty-Five Years of Progress in the R.A.F.* (P. Masefield, Aeroplane, Vol. 64, No. 1,662, 2/4/43, pp. 394-396.)
16	10786	G.B.	*Aircraft v. Submarines.* (Aeroplane, Vol. 64, No. 1,666, 30/4/43, pp. 491-492.)
17	10789	France ...	*French Airmen in Russia.* (Aeroplane, Vol. 64, No. 1,666, 30/4/43, p. 495.)
18	10855	U.S.A. ...	*Training of Naval Fire-Fighters.* (A. D. Rathbone, Sci. Am., Vol. 168, No. 4, April, 1943, pp. 150-153.)
19	10875	G.B.	*Natural Formations.* (A. Falorde, Aeronautics, Vol. 8, No. 4, May, 1942, pp. 36-39.)
20	10955	U.S.A. ...	*U.S.A. New Naval Aircraft Type Designations.* (Inter. Avia., No. 861, 17/3/43, p. 14.)
21	10957	G.B.	*R.A.F. Air Transport Command.* (Inter. Avia., No. 861, 17/3/43, p. 17.)
22	10990	U.S.A. ...	*Popular Names of U.S. Military Aircraft.* (Autom. Ind., Vol. 88, No. 6, 15/3/43, pp. 98-99.)
23	10992	U.S.A. ...	*World Military Aeroplanes Grouped by Types.* (Autom. Ind., Vol. 88, No. 6, 15/3/43, pp. 105-109.)
24	11483	Italy	*Italian Advisory Air Committee.* (Inter. Avia., No. 867, 1/5/43, pp. 29-30.)
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25	10628	G.B.	*Parachute Supply Container Dropped by R.A.F. in Jugoslavia (Photograph).* (Flight, Vol. 43, No. 1,794, 13/5/43, p. 490.)
26	10632	Germany ...	*Pneumatic Dinghy Used by the Luftwaffe (Photo).* (Flight, Vol. 43, No. 1,795, 13/5/43, p. 500.)
27	10737	G.B.	*Enemy Parachute Ammunition Container (Photograph).* (Aeroplane, Vol. 64, No. 1,662, 2/4/43, p. 382.)
28	10871	U.S.A. ...	*Asbestos Fittings for Use in Aircraft.* (Sci. Am., Vol. 168, No. 4, April, 1943, p. 185.)

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29	10874	G.B.	*Armoured Aviation.* (Aeronautics, Vol. 8, No. 4, May, 1942, pp. 33-35.)
30	10951	France ...	*Moram Fighter Trainer Uses Plymex Method of Construction (Wood Veneers Bonded to Al. Sheet).* (Inter. Avia., No. 861, 17/3/43, p. 12.)
31	10969	G.B.	*A Lifeboat Dropped by Parachute.* (Engineer, Vol. 175, No. 4,560, 4/6/43, p. 439.)
32	11056	U.S.A. ...	*Glass-Insulated Portable Shelter for Army Use in the Arctic.* (Sci. Am., Vol. 168, No. 5, May, 1943, p. 222.)
33	11088	Germany ...	*The High Performance Fighter.* (K. Tank, Luftwissen, Vol. 10, No. 4, April, 1943, pp. 99-102.)
34	11142	Germany ...	*Parachute Descent and Time Reserve at Great Heights.* (Gauer and others, Luftfahrtmedizin, Vol. 6, No. 1-4, 23/4/42, p. 340.)
35	11185	U.S.A. ...	*Variable Intensity Pilot Light.* (Autom. Ind., Vol. 88, No. 7, 1/4/43, p. 43.)
36	11199	Germany ...	*Jettisonable Container for Flares and Other Inflammable Materials.* (*Pat. series No.* 3, 730,495.) (Arado, Flugsport, Vol. 35, No. 8, 21/4/43, p. 18.)
37	11201	Germany ...	*Retractable Support for Jettisoning Loads for Aircraft.* (*Pat. series No.* 3, 730,654.) (Junkers, Flugsport, Vol. 35, No. 8, 21/4/43, p. 18.)
38	11208	Germany ...	*Stowage for Jettisonable Loads.* (*Pat. series No.* 3, 731,051.) (Sageb, Flugsport, Vol. 35, No. 8, 21/4/43, p. 19.)
39	11245	U.S.A. ...	*Fire Fighting Equipment on Pan-American Clipper.* (Sci. Am., Vol. 168, No. 6, June, 1943, p. 259.)
40	11308	Germany ...	*Light Aircraft Fitted with Gas Generator.* (Flugsport, Vol. 35, No. 10, 16/6/43, pp. 126-127.)
41	11377	G.B.	*The Duff Norton Aeroplane Jack.* (Airc. Eng., Vol. 15, No. 172, June, 1943, pp. 183-184.)
42	11390	U.S.A. ...	*Improved Aircraft Life Rafts (Wright Field Equipment).* (Aviation, Vol. 42, No. 3, March, 1943, pp. 261 and 370.)
43	11405	U.S.A. ...	*Field Maintenance and Repair of Fighting Aircraft (Digest).* (N. R. Kearney, J.S.A.E., Vol. 51, No. 5, May, 1943, p. 32.)
44	11450	U.S.A. ...	*Fore Part of the Boeing B-17F Dorsal Fin (Drawing).* (Aviation, Vol. 42, No. 4, April, 1943, p. 183.)
45	11459	U.S.A. ...	*Aircraft Maintenance Equipment (Hydraulic Jack for Tyre Removal, Portable Engine Test Stand, etc.).* (Aviation, Vol. 42, No. 4, April, 1943, pp. 223-225.)
46	11480	Italy	*Italian Air Force Equipment.* (Inter. Avia., No. 867, 1/5/43, pp. 21-22.)
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47	10640	G.B.	*Air Gunnery Training.* (Aeroplane, Vol. 64, No. 1,670, 28/5/43, pp. 628-629.)

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48	11810	Germany	...	*German Report of New R.A.F. Explosive Incendiaries.* (Flight, Vol. 43, No. 1,793, 6/5/43, p. 480.)
49	10884	U.S.A.	...	*Armament of Flying Fortress (Boeing B-17E and F).* (Inter. Avia., No. 858, 26/2/43, pp. 7-8.)
50	11093	Germany	...	*A Sound Proof Shooting Range.* (W. Pfeiffer, Luftwissen, Vol. 10, No. 4, April, 1943, p. 118.)
51	11094	Germany	...	*Research on Bombs.* (G. Madelung, Luftwissen, Vol. 10, No. 4, April, 1943, p. 123.)
52	11180	U.S.A.	...	*Boulton Paul Gun Turret Mechanism.* (M. W. Bourdon, Autom. Ind., Vol. 88, No. 7, 1/4/43, pp. 28-33.)
53	11204	Germany	...	*Bomb Stowage.* (*Pat. series No.* 3, 731,050.) (Henschel, Flugsport, Vol. 35, No. 8, 21/4/43, pp. 18-19.)
54	11314	Germany	...	*Gun Installation in Thin Wings.* (*Pat. series No.* 5, 732,734.) (Henschel, Flugsport, Vol. 35, No. 10, 16/6/43, p. 29.)
55	11315	Germany	...	*Gun Mounting in Front of Propeller and Supported on Hub.* (*Pat. series No.* 5, 733,329.) (Junkers, Flugsport, Vol. 35, No. 10, 16/6/43, p. 29.)
56	11453	G.B. ...	...	*The Bristol Hydraulically-Operated Power-Driven Gun Turret (Drawing).* (Aviation, Vol. 42, No. 4, April, 1943, p. 187.)
57	11460	U.S.A.	...	*Designing Gun Turrets as Integral Part of Aircraft.* (L. G. Frise, Aviation, Vol. 42, No. 4, April, 1943, pp. 227-231.)
58	11465	U.S.A.	...	*Martin Gun Interrupter on U.S. Combat Planes.* (Aviation, Vol. 42, No. 4, April, 1943, p. 307.)
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64	10626	G.B. ...	...	*Hurricane on Catapult Mounting (Photograph).* (Flight, Vol. 43, No. 1,795, 20/5/43, p. 537.)
65	10631	G.B. ...	...	*Hawker's Latest Fighter—The Typhoon (2,400 h.p. Napier Sabre).* (Flight, Vol. 43, No. 1,794, 13/5/43, pp. 496-498.)
66	10642	Japan	...	*Mitsubishi Navy SHS-OO Single-Seat Fighter Float Planes (Photograph).* (Aeroplane, Vol. 64, No. 1,669, 21/5/43, p. 583.)
67	10643	G.B. ...	...	*Supermarine Spitfire IX (Photograph).* (Aeroplane, Vol. 64, No. 1,669, 21/5/43, p. 582.)

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68	10645	G.B.	*A Fighting Mosquito Squadron.* (Aeroplane, Vol. 64, No. 1,669, 21/5/43, pp. 588-589.)
69	10653	G.B.	*The Airspeed Oxford Trainer.* (Flight, Vol. 43, No. 1,786, 27/5/43, pp. 549-551.)
70	10661	G.B.	*Supermarine Spitfire V.B.'s Flying Over Australian Mainland (Photograph).* (Aeroplane, Vol. 64, No. 1,668, 14/5/43, p. 550.)
71	10668	G.B.	*The Typhoon, its History and Development: The Sopwith Types,* 1914-1918; *Earlier Hawker Types,* 1923-1929; *The Furies,* 1933-1936; *Hurricane to Typhoon,* 1935-1943. (Aeroplane, Vol. 64, No. 1,668, 14/5/43, pp. 559-566.)
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73	10670	G.B.	*The Fairey Swordfish—its Work in Naval Operations.* (Aeroplane, Vol. 64, No. 1,668, 14/5/43, pp. 572-573.)
74	10736	Japan ...	*Wreckage of a Mitsubishi SSH-OO Float Plane Fighter (Photo).* (Aeroplane, Vol. 64, No. 1,662, 2/4/43, p. 382.)
75	10744	G.B.	*Some Notable Aeroplanes of the R.A.F.,* 1918-1943 *(Photographs).* (Aeroplane, Vol. 64, No. 1,662, 2/4/43, pp. 390-391.)
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86	10803	G.B.	*Hawker Typhoon (Recognition Details).* (Flight, Vol. 43, No. 1,793, 6/5/43, p. 466.)
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97	10945	G.B. ...	... *Fairey Barracuda Torpedo and Dive Bomber.* (Inter. Avia., No. 861, 17/3/43, p. 7.)
			Military Types of Aircraft (U.S.A.).
98	10620	U.S.A.	... *Republic Thunderbolts (P.47).* (Flight, Vol. 43, No. 1,795, 20/5/43, p. 520.)
99	10629	U.S.A.	... *U.S. Navy and Marine Wildcats (Photograph).* (Flight, Vol. 43, No. 1,794, 13/5/43, p. 491.)
100	10630	U.S.A.	... *Douglas Skymaster (C-54) Transport (Photo).* (Flight, Vol. 43, No. 1,794, 13/5/43, p. 491.)
101	10636	U.S.A.	... *Grumman Goose I (Recognition Details).* (Flight, Vol. 43, No. 1,794, 13/5/43, p. a.)
102	10637	U.S.A.	... *Chance-Vought Corsair Single-Seat Fighter (Photo).* (Aeroplane, Vol. 64, No. 1,670, 28/5/43, p. 612.)
103	10638	U.S.A.	... *Sikorsky Helicopter (Photo).* (Aeroplane, Vol. 64, No. 1,670, 28/5/43, p. 612.)
104	10641	U.S.A.	... *The Seamew (Curtiss SO3C-1) (Photograph).* (Aeroplane, Vol. 64, No. 1,669, 21/5/43, p. 581.)
105	10646	U.S.A.	... *American Aeroplanes in Service—XIII (Silhouettes).* (Aeroplane, Vol. 64, No. 1,669, 21/5/43, p. 590.)
106	10647	U.S.A.	... *The Thunderbolt (Recognition Details).* (Aeroplane, Vol. 64, No. 1,669, 21/5/43, pp. 591-592.)
107	10649	U.S.A.	... *The Beechcraft D-17R (Recognition Details).* (Aeroplane, Vol. 64, No. 1,669, 21/5/43, p. 601.)
108	10655	U.S.A.	... *Fairchild Cornell (Recognition Details).* (Flight, Vol. 43, No. 1,786, 27/5/43, p. a.)
109	10656	U.S.A.	... *Aeronca L-58B Defender.* (Flight, Vol. 43, No. 1,786, 27/5/43, p. b.)
110	10660	U.S.A.	... *Republic P-47 Thunderbolt (Photograph).* (Aeroplane, Vol. 64, No. 1,668, 14/5/43, p. 550.)
111	10662	U.S.A.	... *Photograph of North American Mitchells Taking Off to Raid Tokio.* (Aeroplane, Vol. 64, No. 1,668, 14/5/43, p. 551.)
112	10665	U.S.A.	... *Vultee Vengeance (Photograph).* (Aeroplane, Vol. 64, No. 1,668, 14/5/43, p. 553.)

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113	10666	U.S.A.	...	*Martin Mariner* (*Photograph*). (Aeroplane, Vol. 64, No. 1,668, 14/5/43, p. 554.)
114	10750	U.S.A.	...	*North American Mitchells* (*Photo*). (Aeroplane, Vol. 64, No. 1,667, 7/5/43, p. 528.)
115	10751	U.S.A.	...	*Fuselage of Curtiss Warhawk Stowed Inside Cabin of Douglas C-47 Skytrain* (*Photo*). (Aeroplane, Vol. 64, No. 1,667, 7/5/43, p. 528.)
116	10753	U.S.A.	...	*American Aeroplanes in Service—XII* (*Silhouettes*). (Aeroplane, Vol. 64, No. 1,667, 7/5/43, p. 532.)
117	10788	U.S.A.	...	*Noorduyn Norseman UC-64* (*Photo*). (Aeroplane, Vol. 64, No. 1,666, 30/4/43, p. 495.)
118	10793	U.S.A.	...	*Douglas A-20C Havoc Bombers Boston IIIe* (*Photograph*). (Aeroplane, Vol. 64, No. 1,666, 30/4/43, p. 498.)
119	10807	U.S.A.	...	*The Lockheed-Vega Ventura*. (Flight, Vol. 43, No. 1,793, 6/5/43, p. 478.)
120	10847	U.S.A.	...	*Fairchild Cornell Trainers* (*Photographs*). (Pegasus, Vol. 1, No. 2, Feb., 1943, pp. 11-12.)
121	10868	U.S.A.	...	*The Lockheed Constellation*. (Sci. Am., Vol. 168, No. 4, April, 1943, pp. 182-183.)
122	10876	U.S.A.	...	*Lockheed "Constellation"* (*C-69*). (Aeronautics, Vol. 8, No. 4, May, 1942, pp. 40-41.)
123	10877	U.S.A.	...	*Curtiss Caravan* (*C-76*) (*Photograph*). (Aeronautics, Vol. 8, No. 4, May, 1942, pp. 40-41.)
124	10880	U.S.A.	...	*Vought-Sikorsky V.S. 300*. (Aeronautics, Vol. 8, No. 4, May, 1942, pp. 64-65.)
125	10882	U.S.A.	...	*Curtiss Wright Caravan* (*C-76*). (Inter. Avia., No. 858, 26/2/43, pp. 1 and 7.)
126	10883	U.S.A.	...	*Lockheed C-69 Constellation*. (Inter. Avia., No. 858, 26/2/43, p. 7.)
127	10885	U.S.A.	...	*Curtiss SO3C-1 Scout "Seagull."* (Inter. Avia., No. 858, 26/2/43, p. 8.)
128	10886	U.S.A.	...	*Piper H.E.-1 Ambulance Plane*. (Inter. Avia., No. 858, 26/2/43, pp. 1 and 8.)
129	10909	U.S.A.	...	*Brewster Bermuda Dive Bomber*. (Inter. Avia., No. 859-860, 6/3/43, p. 8.)
130	10910	U.S.A.	...	*Manta Long Range Fighter*. (Inter. Avia., No. 859-860, 6/3/43, p. 7.)
131	10911	U.S.A.	...	*Grumman Avenger Torpedo Plane* (*Photo*). (Inter. Avia., No. 859-860, 6/3/43, p. 1.)
132	10912	U.S.A.	...	*Curtiss "Seagull" Scout* (*Photo*). (Inter. Avia., No. 859-860, 6/3/43, p. 1.)
133	10914	U.S.A.	...	*Curtiss C-76 Caravan*. (Inter. Avia., No. 859-860, 6/3/43, pp. 1 and 7-8.)
134	10915	U.S.A.	...	*Martin P.B. M-3 Mariner Patrol Bomber* (*Photo*). (Inter. Avia., No. 859-860, 6/3/43, p. 1.)
135	10916	U.S.A.	...	*Fairchild AT-14 Trainer*. (Inter. Avia., No. 859-860, 6/3/43, pp. 1 and 8-9.)
136	10917	U.S.A.	...	*Vultee A-31 Dive Bomber* (*Georgia or Vengeance*). (Inter. Avia., No. 859-860, 6/3/43, pp. 1 and 9.)
137	10924	U.S.A.	...	*Vought Sikorsky Single-Seat Naval Fighter F4U-1 "Corsair."* (Inter. Avia., No. 856-857, 15/2/43, p. 11.)
138	10925	U.S.A.	...	*Republic P-47 Thunderbolt High Level Fighter*. (Inter. Avia., No. 856-857, 15/2/43, p. 11.)

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139	10926	U.S.A.	...	*Lockheed P.38-E Lightning.* (Inter. Avia., No. 856-857, 15/2/43, pp. 11-12.)
140	10927	U.S.A.	...	*North American P-51 "Mustang."* (Inter. Avia., No. 856-857, 15/2/43, p. 12.)
141	10928	U.S.A.	...	*North American B-25 Mitchell Medium Bomber.* (Inter. Avia., No. 856-857, 15/2/43, p. 12.)
142	10929	U.S.A.	...	*Curtiss Helldiver S.B.2C-1.* (Inter. Avia., No. 856-857, 15/2/43, p. 12.)
143	10930	U.S.A.	...	*Douglas Dive Bombers.* (Inter. Avia., No. 856-857, 15/2/43, p. 13.)
144	10931	U.S.A.	...	*Cessna C-78 Liaison.* (Inter. Avia., No. 856-857, 15/2/43, pp. 1 and 13.)
145	10932	U.S.A.	...	*Grumman Avenger Torpedo Bomber.* (Inter. Avia., No. 856-857, 15/2/43, p. 13.)
146	10934	U.S.A.	...	*Piper Cub Liaison Plane.* (Inter. Avia., No. 856-857, 15/2/43, pp. 11 and 17.)
147	10940	U.S.A.	...	*Lockheed L-49 Constellation (Photo).* (Inter. Avia., No. 856-857, 15/2/43, p. 1.)
148	10941	U.S.A.	...	*Fairchild AT-13 Trainer (Photo).* (Inter. Avia., No. 856-857, 15/2/43, p. 11.)
149	10942	U.S.A.	...	*Boeing AT-15 Trainer (Photo).* (Inter. Avia., No. 856-857, 15/2/43, p. 11.)
150	10944	U.S.A.	...	*Brewster SB2A-2 Navy Dive Bomber (Photograph).* (Inter. Avia., No. 861, 17/3/43, p. 1.)
151	10954	U.S.A.	...	*Lockheed C-69 Constellation Transport.* (Inter. Avia., No. 861, 17/3/43, pp. 1 and 13-14.)
152	10998	U.S.A.	...	*The Vega PV-1 Patrol Plane (Photograph).* (Autom. Ind., Vol. 88, No. 6, 15/3/43, p. 134.)
153	10999	U.S.A.	...	*The Goodyear FG-1 Single-Seater Fighter (Photograph).* (Autom. Ind., Vol. 88, No. 6, 15/3/43, p. 134.)
154	11177	G.B.	...	*The Halifax Four-Engined Bomber.* (Engineer, Vol. 175, No. 4,562, 18/6/43, p. 490.)
155	11246	U.S.A.	...	*Sikorsky Helicopter (Latest Type).* (Sci. Am., Vol. 168, No. 6, June, 1943, p. 275.)
156	11309	U.S.A.	...	*Republic P.47 Thunderbolt.* (Flugsport, Vol. 35, No. 10, 16/6/43, pp. 127-128.)
157	11469	G.B.	...	*Avro Anson Mark V.* (Aviation, Vol. 42, No. 4, April 23, p. 313.)
				Military Types of Aircraft (U.S.S.R.).
158	10623	U.S.S.R.	...	*Stormovik Il-2C (Recognition Details).* (Flight, Vol. 43, No. 1,795, 20/5/43, p. a.)
159	10948	U.S.S.R.	...	*Russian Fighter Types I-18, I-20, I-26.* (Inter. Avia., No. 861, 17/3/43, pp. 1 and 10.)
160	11095	U.S.S.R.	...	*A Close-up of the LAGG-3 Russian Fighter.* (A. Hulten, Flyg och Motor, Vol. 2, No. 6-7, March-April, 1943, pp. 25-27 and 21-24.)
				Military Types of Aircraft (Sweden).
161	10891	Sweden	...	*Swedish Dive Bomber B-17 with Retractable Snow Skids.* (Inter. Avia., No. 858, 26/2/43, pp. 1 and 18.)

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			Military Types of Aircraft (Germany).
162	10644	Germany ...	*Arado Ar 68E as a Fighter Trainer* (*Photo*). (Aeroplane, Vol. 64, No. 1,669, 21/5/43, p. 587.)
163	10664	Germany ...	*Heinkel He. 111 H3 with Bomb Slung Externally Under the Centre Section* (*Photograph*). (Aeroplane, Vol. 64, No. 1,668, 14/5/43, p. 553.)
164	10752	Germany ...	*Bücker Bestmann Two-Seat Cabin Monoplanes.* (Aeroplane, Vol. 64, No. 1,667, 7/5/43, p. 531.)
165	10881	Germany ...	*Two German Six-Engined Aircraft* (*Me. 323 and Blohm and Voss 222*). (Aeronautics, Vol. 8, No. 4, May, 1942, p. 87.)
166	10892	Germany ...	*Messerschmitt Me. 109 G-2 High Altitude Fighter.* (Inter. Avia., No. 858, 26/2/43, p. 15.)
167	10893	Germany ...	*Messerschmitt Me. 210 Long Range Fighter.* (Inter. Avia., No. 858, 26/2/43, pp. 15-16.)
168	10894	Germany ...	*Henschell Hs. 129* (*Ground Attack Fighter*). (Inter. Avia., No. 858, 26/2/43, p. 16.)
169	10895	Germany ...	*Junkers Ju. 87D Dive Bomber.* (Inter. Avia., No. 858, 26/2/43, p. 16.)
170	10939	Germany ...	*Junkers Ju. 90S Four-Engined Transport* (*Photo*). (Inter. Avia., No. 856-857, 15/2/43, p. 1.)
171	10949	Germany ...	*Arado Ar. 96, Built by S.I.P.A.* (Inter. Avia., No. 861, 17/3/43, p. 10.)
172	11181	Germany ...	*Germany's Newest Fighter Bomber, Messerschmitt 210 A-1.* (M. W. Bourdon, Autom. Ind., Vol. 88, No. 7, 1/4/43, pp. 34-37.)
173	11182	Germany ...	*German Warplanes* (*Me. 109 G-2, He. 129 and Ju. 87-D-1*). (Autom. Ind., Vol. 88, No. 7, 1/4/43, p. 37.)
			Military Types of Aircraft (Italy).
174	10622	Italy	*The Macchi C-202 Single-Seater Fighter* (*Photograph*). (Flight, Vol. 43, No. 1,795, 20/5/43, p. 526.)
175	10667	Italy	*Savoia-Marchetti SM79 Sparviero Carrying Torpedo* (*Photograph*). (Aeroplane, Vol. 64, No. 1,668, 14/5/43, p. 556.)
176	10791	Italy	*Cant Z 506 B Airone on Air-Sea Rescue Operations* (*Photograph*). (Aeroplane, Vol. 64, No. 1,666, 30/4/43, p. 499.)
			Military Types of Aircraft (France).
177	10739	France ...	*Three French Flying Boats Reported Seized by the Germans.* (Aeroplane, Vol. 64, No. 1,662, 2/4/43, p. 384.)
178	10913	France ...	*Large French Flying Boat* (*Trials*). (Inter. Avia., No. 859-860, 6/3/43, p. 21.)
179	10920	France ...	*Bloch 157 Single-Seat Fighter.* (Inter. Avia., No. 859-860, 6/3/43, p. 21.)
180	10950	France ...	*Bloch 161* (*SO 161*) *Four-Engined Transport.* (Inter. Avia., No. 861, 17/3/43, pp. 1 and 11-12.)
181	10952	France ...	*SE 200 and Latécoère 631 Giant Flying Boats.* (Inter. Avia., No. 861, 17/3/43, p. 12.)
182	10953	France ...	*French Stratosphere Aircraft Proposed by CAPRI.* (Inter. Avia., No. 861, 17/3/43, p. 13.)

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183	11188	France ..	*Mauboussin M. 300 Trainer.* (Flugsport, Vol. 35, No. 8, 21/4/43, p. 90.)
184	11189	France ...	*Mauboussin M. 400 Transport Biplane.* (Flugsport, Vol. 35, No. 8, 21/4/43, p. 91.)
185	11472	France ..	*Loire-Nieuport Dive Bomber.* (Inter. Avia., Vol. 867, 1/5/43, p. 10.)
186	11501	France ...	*Breguet 500 Transport Plane with High Lift Device (Ce=3 max.).* (Inter. Avia., No. 868, 10/5/43, p. 17.)
			Gliders.
187	10794	Germany ...	*Tailless Horten III Glider (Pilot in Prone Position).* (Aeroplane, Vol. 64, No. 1,666, 30/4/43, p. 501.)
188	10887	U.S.A. ...	*Piper TG-8 Training Glider.* (Inter. Avia., No. 858, 26/2/43, pp. 1 and 9.)
189	10918	U.S.A. ...	*American Glider Development.* (Inter. Avia., No. 859-860, 6/3/43, pp. 9-10.)
190	10947	Germany ...	*Messerschmitt Me. 323 Power Glider.* (Inter. Avia., No. 861, 17/3/43, p. 9.)
191	11179	U.S.A. ...	*Army CG-4 Heavy Gliders (Photos).* (Autom. Ind., Vol. 88, No. 7, 1/4/43, p. 23.)
192	11307	France ...	*Castel-Mauboussin Gliders (C30, C301S, C31P, L25S, etc.).* (Flugsport, Vol. 35, No. 10, 16/6/43, pp. 123-126.)
193	11334	Germany ...	*Sail Plane Caudron C800 and C810.* (Flugsport, Vol. 35, No. 9, 19/5/43, pp. 105-107.)
			Aircraft Carriers.
194	10658	G.B.	*Escort Carriers for Atlantic Convoys.* (Flight, Vol. 43, No. 1,786, 27/5/43, p. 559.)
195	11231	G.B.	*Ship Flying and Aircraft Carriers—I.* (P. Bethell, Engineering, Vol. 156, No. 4,042, 2/7/43, pp. 1-4.)
196	11278	G.B.	*"Seadromes" in the Atlantic.* (Engineering, Vol. 155, No. 4,041, 25/6/43, p. 508.)
197	11482	G.B.	*British Aircraft Carriers (Losses and Construction).* (Inter. Avia., No. 867, 1/5/43, pp. 26-27.)
198	11757	Switzerland ...	*Floating Air Bases.* (Inter. Avia., No. 869-870, 18/5/43, p. 29.)

AERODYNAMICS AND HYDRODYNAMICS.

General Aerodynamics.

199	10854	U.S.A. ...	*The Influence of Sweep on the Spanwise Lift Distribution of Wings.* (F. Theilheimer, J. Aeron. Sci., Vol. 10, No. 3, March, 1943, pp. 101-104.)
200	11022	Germany ...	*Some Experiments on the Increase in the Maximum Lift of an Aerofoil Undergoing a Change of Incidence at a Constant Angular Velocity.* (N. Scheubel, German Academy of Aeron. Research, Collected Reports No. 1, 1942, pp. 37-45.)
201	11023	Germany ...	*The Activated Flow.* (A. Proll, German Academy of Aeron. Research, Collected Reports No. 1, 1942, pp. 47-62.)

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202	11572	Germany ...	*The Effect of Compressibility on Thin Slightly Cambered Profiles at Subsonic Speeds.* (W. Hantzsche and H. Wendt, Z.A.A.M., Vol. 22, No. 2, April, 1942, pp. 72-86.)

Wind Tunnels.

203	10717	U.S.A. ...	*Wind Tunnel Tests to Determine Stack Heights (Dissipation of Flue Gases).* (H. L. Von Hohenleiten and E. F. Wolf, Trans. A.S.M.E., Vol. 64, No. 7, Oct., 1942, pp. 671-683.)
204	10853	U.S.A. ...	*Wind Tunnel Cooling.* (A. N. Tifford, J. Aeron. Sci., Vol. 10, No. 3, March, 1943, pp. 98-100.)
205	10919	U.S.A. ...	*700 m.p.h. Wind Tunnel at Pasadena.* (Inter. Avia., No. 859-860, 6/3/43, p. 14.)
206	11247	U.S.A. ...	*New Light Speed Low Density Refrigerated Wind Tunnel (600 m.p.h., 67°F., 40,000 ft.).* (Sci. Am., Vol. 168, No. 6, June, 1943, p. 276.)

General Hydrodynamics.

210	10716	U.S.A. ...	*The Flow of a Flashing Mixture of Water and Steam Through Pipes.* (M. W. Benjamin and J. G. Miller, Trans. A.S.M.E., Vol. 64, No. 7, Oct., 1942, pp. 657-669.)
211	10719	U.S.A. ...	*Correlation of Coefficient of Friction with Drilling Torque and Thrust for Different Types of Cutting Fluids (Advantage of Sulphurised Oil Under Conditions of Seizure).* (A. O. Schmidt and others, Trans. A.S.M.E., Vol. 64, No. 7, Oct., 1942, pp. 703-709.)
212	10728	U.S.A. ...	*Heat Transfer Pressure Drop and Fouling Rates of Liquids for Continuous Longitudinal Fins (Laminar Flow).* (A. T. Gunter and W. A. Shaw, Trans. A.S.M.E., Vol. 64, No. 8, Nov., 1942, pp. 795-804.)
213	10819	G.B.	*Wave Analysis (Part III).* (K. Browne, Elect. Eng., Vol. 15, No. 184, June, 1942, pp. 31-36.)
214	10844	Switzerland ...	*Flow Investigations on Safety Device Incorporated in Hydraulic Power Installations.* (C. Keller and I. Vaskovic, Escher-Wyss, No. 15-16, 1942-1943, pp. 191-202.)
215	11040	G.B.	*Coefficient of Propulsive Efficiency (Marine Propellers).* (K. C. Burnaby, Engineer, Vol. 175, No. 4,561, 11/6/43, pp. 472-475.)
216	11074	G.B.	*Breakwaters (Contd.).* (R. R. Minikin, Engineering, Vol. 155, No. 4,038, 4/6/43, pp. 441-443.)
217	11163	G.B.	*The Construction of Breakwaters.* (R. R. Minikin, Engineering, Vol. 155, No. 4,040, 18/6/43, pp. 481-482.)
218	11299	U.S.A. ...	*American Wartime Ship Construction.* (Engineer, Vol. 176, No. 4,564, 2/7/43, pp. 4-6.)
219	11571	Germany ...	*Water Seepage Through a Dam and Pressure Distribution Over Base.* (H. Rossbach, Z.A.M.M., Vol. 22, No. 2, April, 1942, pp. 65-72.)

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AIRCRAFT, ACCESSORIES AND AIRSCREWS.

Civil and Experimental Aircraft.

220	10648	G.B. ...	... *The Heston Phœnix (Recognition Details).* (Aeroplane, Vol. 64, No. 1,669, 21/5/43, p. 601.)
221	10659	G.B. ...	... *The Mumford Helicopter (Early Experiments).* (Flight, Vol. 43, No. 1,786, 27/5/43, p. 561.)
222	10735	G.B. ...	... *The Heston Racer (including Photo).* (Aeroplane, Vol. 64, No. 1,662, 2/4/43, pp. 378, 384.)
223	10801	G.B. ...	... *Control of the Heston Racer.* (Aeroplane, Vol. 64, No. 1,666, 30/4/43, p. 520.)

General Design and Construction.

224	10657	G.B. ...	... *Early Designs of Tailless Aircraft.* (Flight, Vol. 43, No. 1,786, 27/5/43, pp. 556-557.)
225	11092	Germany	... *Problems of Aircraft Development.* (A. Lippisch, Luftwissen, Vol. 10, No. 4, April, 1943, pp. 113-118.)
226	11382	U.S.A.	... *Use of Glue in Aircraft Construction.* (J. T. Stephen, Aviation, Vol. 42, No. 3, March, 1943, pp. 132-133 and 311-323.)
227	11420	G.B. ...	... *Design for Freight Transport Plane for Perishable Goods (Photograph).* (Metal Industry, Vol. 62, No. 25, 18/6/43, p. 394.)
228	11446	U.S.A.	... *Design Considerations for Plywood Structures. Part IV—Wings.* (L. J. Marhoefer, Aviation, Vol. 42, No. 4, April, 1943, pp. 164-167 and 360-364.)

Stability and Control.

229	11055	U.S.A.	... *Study of Flutter Problems.* (Sci. Am., Vol. 168, No. 5, May, 1943, p. 220.)
230	10851	U.S.A.	... *Note on Paper Entitled "Proportioning a Canard for Longitudinal Stability and Safety Against Stall" (Dec., 1942).* (F. V. Foa, J. Aeron. Sci., Vol. 10, No. 3, p. 90.)
231	11264	U.S.A.	... *Torsional and Aileron Flutter.* (Z. Krzwoblocki, J. of Aeron. Sci., Vol. 10, No. 5, May, 1943, pp. 161-168.)
232	11352	Germany	... *Device for the Dynamic Stabilisation of Aircraft. (Pat series No. 4, 733,588.)* (Junkers, Flugsport, Vol. 35, No. 9, 19/5/43, pp. 25-26.)
233	11263	U.S.A.	... *A New Method of Longitudinal Control for Aircraft by Use of an Adjustable Angle of Attack Balance.* (R. J. White, J. of Aeron. Sci., Vol. 10, No. 5, May, 1943, pp. 152-160.)
234	11353	Germany	... *Automatic Device for Limiting the Vertical Acceleration of Aircraft. (Pat. series No. 4, 733,581.)* (Potez, Flugsport, Vol. 35, No. 9, 19/5/43, p. 26.)

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			Take-off.
235	11024	Germany ...	*The Rôle of Composite Aircraft in Comparison with Other Methods of Assisted Take-off.* (W. Hoff, German Academy of Aeron. Research, Report No. I, 1942, pp. 1-35.)
236	11468	Germany ...	*Nazi Rocket Take-offs?* (Aviation, Vol. 42, No. 4, April, 1943, p. 312.)
			Performance and Testing.
237	10713	U.S.A. ...	*Test Stand for Centrifugal and Propeller Pumps.* (G. F. Wislicenus, Trans. A.S.M.E., Vol. 64, No. 6, Aug., 1942, pp. 619-624.)
238	10848	U.S.A. ...	*Manœuvrability Criteria Through Turning Performance.* (J. E. Goode, J. Aeron. Sci., Vol. 10, No. 3, March, 1943, pp. 73-80.)
239	11436	U.S.A. ...	*Flight Testing.* (E. T. Allen, Aviation, Vol. 42, No. 4, April, 1943, pp. 108-112.)
			Post-War Aviation.
240	10627	G.B.	*Air Freight.* (W. A. Patterson, Flight, Vol. 43, No. 1,795, 20/5/43, p. 532.)
241	10663	G.B.	*An Empire Air Council (Lord Bennet's Proposal).* (Aeroplane, Vol. 64, No. 1,668, 14/5/43, p. 551.)
242	10747	G.B.	*The Board of British Overseas Airways Corporation and Air Transport Command.* (Aeroplane, Vol. 64, No. 1,662, 2/4/43, p. 402.)
243	10795	G.B.	*Shipowners and Air Transport.* (R. H. Thorton, Aeroplane, Vol. 64, No. 1,666, 30/4/43, pp. 502-503.)
244	10798	G.B.	*An International Air Port Plan.* (Aeroplane, Vol. 64, No. 1,666, 30/4/43, pp. 506-507.)
245	10800	U.S.A. ...	*U.S.A. and Post-War Bases in the Pacific.* (Aeroplane, Vol. 64, No. 1,666, 30/4/43, p. 516.)
246	11269	U.S.A. ...	*Post-War Aviation (Paper Presented at R. Aero. Soc.).* (E. Warner, Engineer, Vol. 175, No. 4,563, 25/6/43, pp. 506-507.)
247	11301	G.B.	*The S.B.A.C. and Civil Aviation.* (Engineer, Vol. 176, No. 4,564, 2/7/43, pp. 10-11 and 17.)
248	11456	U.S.A. ...	*Post-War Preview of European Airways.* (M. A. Garbell, Aviation, Vol. 42, No. 4, April, 1943, pp. 202-203, 337-338.)
249	11471	Switzerland ...	*Flying Boat or Land Plane for Civil Aviation.* (Inter. Avia., No. 867, 1/5/43, pp. 1-5.)
			Propellers.
250	10869	U.S.A. ...	*New Dual Counter-Rotating Propeller (Hamilton).* (Sci. Am., Vol. 168, No. 4, April, 1943, p. 183.)
251	11097	G.B.	*Propeller Sense.* (A.M. Pamphlet 153.)
252	11190	France ...	*Nozzle Propellers and Jet Propulsion (Rateau-Auxionuary).* (Flugsport, Vol. 35, No. 8, 21/4/43, pp. 92-95.)
253	11193	Germany ...	*Method of Attachment for Leading Edge Protection Plate on Wooden Airscrews. (Pat. series No. 3, 730,097.)* (H. Heine, Flugsport, Vol. 35, No. 8, 21/4/43, p. 13.)

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254	11195	Germany ...	*Variable Pitch Propeller with Rapid Decrease in Pitch for Braking Purposes.* (*Pat. series No.* 3, 730,552.) (C. R. Waseige, Flugsport, Vol. 35, No. 8, 21/4/43.)
255	11196	Germany ...	*Combined Throttle and Pitch Change Control.* (*Pat. series No.* 3, 731,340.) (Heinkel, Flugsport, Vol. 35, No. 8, 21/4/43, p. 14.)
256	11197	Germany ...	*Method for Locking Blade of a Hydraulically Operated V.P. Airscrew.* (*Pat. series No.* 3, 730,378 *and* 731,986.) (Escher Wyss, Flugsport, Vol. 35, No. 8, 21/4/43, pp. 14 and 15-16.)
257	11198	Germany ...	*V.P. Operation by Means of an Electric Motor Freely Mounted on Propeller Hub, Torque Reaction being Balanced by Means of a Wind Vane.* (*Pat. series No.* 3, 730,553.) (Argus, Flugsport, Vol. 35, No. 8, 21/4/43, pp. 14-15.)
258	11200	Germany ...	*Variable Speed Blade Setting for V.P. Airscrews.* (*Pat. series No.* 3, 730,554.) (V.D.M., Flugsport, Vol. 35, No. 8, 21/4/43, p. 15.)
259	11202	Germany ...	*Airscrew Blade Pounded with Adjustable Longitudinally Projecting Tip.* (*Pat. series No.* 3, 732,051.) (Junkers, Flugsport, Vol. 35, No. 8, 21/4/43, p. 16.)
260	11203	Germany ...	*Blade Control with Varying Sensitivity.* (*Pat. series No.* 3, 730,900.) (Argus, Flugsport, Vol. 35, No. 8, 21/4/43, p. 16.)
261	11402	U.S.A. ...	*Electronic Method for Endurance of Propeller Components* (*Digest*). (R. M. Guerke and G. P. Knapp, J.S.A.E., Vol. 51, No. 5, May, 1943, p. 35.)
262	11409	U.S.A. ...	*Plastic Bearings for Propeller Shafts* (*Micarta*). (Ind. and Eng. Chem., Vol. 21, No. 8, 25/4/43, p. 560.)
263	11458	U.S.A. ...	*Dynamic Balancing in Propeller Maintenance.* (B. J. Cumnock, Aviation, Vol. 42, No. 4, April, 1943, pp. 214 and 403.)
264	11475	U.S.A. ...	*American Contra-Rotating Airscrews* (*Curtiss General Motors, Hamilton*). (Inter. Avia., No. 867, 1/5/43, pp. 1 and 12-13.)
265	11667	U.S.A. ...	*Anti-Icing Propeller Covers.* (Aero Digest, Vol. 42, No. 5, May, 1943, p. 409.)
			Rotating-Wing Aircraft.
266	11318	Germany ...	*Blade Control for Helicopter Fitted with Two Inclined Rotors, Altitude and Direction.* (*Pat. series No.* 5, 732,735.) (Focke, Flugsport, Vol. 35, No. 10, 16/6/43, pp. 30-31.)
267	11319	Germany ...	*Incidence Distribution for Autogyro Blades.* (*Pat. series No.* 5, 733,011.) (Asboth, Flugsport, Vol. 35, No. 10, 16/6/43, p. 31.)
268	11320	Germany ...	*Pendulum Stabilisation for Autogyros.* (*Pat. series No.* 5, 732,924.) (Wertenson, Flugsport, Vol. 35, No. 10, 16/6/43, p. 31.)
269	11321	Germany ...	*Tethering Device for Helicopters* (*Four Point*). (*Pat. series No.* 5, 733,861.) (A.E.G., Flugsport, Vol. 35, No. 10, 16/6/43, p. 32.)

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270	11569	U.S.A. ...	*A Method of Rapid Estimation of Helicopter Performance.* (Q. Weld, J. Aeron. Sci., Vol. 10, No. 4, April, 1943, pp. 131-135.)
			Windscreens, Cabins.
271	11002	U.S.A. ...	*Testing New Bird-Proof Windshield* (*Photo*). (Autom. Ind., Vol. 88, No. 6, 15/3/43, p. 142.)
272	11209	Germany ...	*Oil Hydraulic System for Pressure Control in Pressure Cabin.* (*Pat. series No.* 3, 731,646.) (Henschel, Flugsport, Vol. 35, No. 8, 21/4/43, p. 17.)
273	11338	Germany ...	*Quick Release Opening for Pressure Cabins.* (*Pat. series No.* 4, 732,915.) (Arado, Flugsport, Vol. 35, No. 9, 19/5/43, p. 21.)
274	11339	Germany ...	*Anti-Dazzle Device for Nose Cockpits.* (*Pat. series No.* 4, 732,383.) (Heinkel, Flugsport, Vol. 35, No. 9, 19/5/43, p. 21.)
275	11340	Germany ...	*Anti-Draught Device for Cockpit Windows.* (*Pat. series No.* 4, 732,705.) (Junkers, Flugsport, Vol. 35, No. 9, 19/5/43, p. 21.)
276	11341	Germany ...	*Sealed Cavity Window for Pressure Cabins.* (*Pat. series No.* 4, 732,916.) (Junkers, Flugsport, Vol. 35, No. 9, 19/5/43, pp. 21-22.)
277	11396	U.S.A. ...	*Bird-Resisting Windshield* (*Digest*). (A. L. Morse, J.S.A.E., Vol. 51, No. 5, May, 1943, p. 27.)
			Wings and Flaps, etc.
278	11342	Germany ...	*Improvements in the Effectiveness of Control Surfaces* (*Air Ejection*). (*Pat. series No.* 4, 732,536.) (Junkers, Flugsport, Vol. 35, No. 9, 19/5/43, p. 22.)
279	11343	Germany ...	*Flapped Wing with Suction Control at Edge.* (*Pat. series No.* 4, 733,114.) (H. V. A. Goethinger, Flugsport, Vol. 35, No. 9, 19/5/43, p. 22.)
280	11344	Germany ...	*Suction Control for Wing Flaps.* (*Pat. series No.* 4, 733,445.) (Arado, Flugsport, Vol. 35, No. 9, 19/5/43, p. 22.)
281	11345	Germany ...	*Variable Camber Flap Control.* (*Pat. series No.* 4, 732,918.) (Heinkel, Flugsport, Vol. 35, No. 9, 19/5/43, p. 23.)
282	11346	Germany ...	*Sealing Plate for Flaps Capable of Aileron Action.* (*Pat. series No.* 4, 733,493.) (Heinkel, Flugsport, Vol. 35, No. 9, 19/5/43, p. 23.)
283	11347	Germany ...	*Wing Spoiler* (*Automatic Action*). (*Pat. series No.* 4, 733,504.) (D. F. S. Darmstadt, Flugsport, Vol. 35, No. 9, 19/5/43, p. 23.)
284	11348	Germany ...	*One Piece Sheet Metal Wing with Integral Webs* (*Produced by Folding*). (*Pat. series No.* 4, 732,594.) (Henschel, Flugsport, Vol. 35, No. 9, 19/5/43, p. 24.)
285	11349	Germany ...	*Wing Structure Consisting of Two Shells Incorporating Flanges for Spars.* (*Pat. series No.* 4, 732,919.) (Arado, Flugsport, Vol. 35, No. 9, 19/5/43, pp. 24-25.)

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286	11351	Germany	...	*Variable Surface Wing.* (*Pat. series No.* 4, 732,537.) (J. Gerrin, Flugsport, Vol. 35, No. 9, 19/5/43, p. 25.)
287	11354	Germany	...	*Adjustable Mass Balance for the Control Surfaces of Experimental Aircraft.* (*Pat. series No.* 4, 732,920.) (Arado, Flugsport, Vol. 35, No. 9, 19/5/43, p. 26.)
288	11355	Germany	...	*Device for the Coarse and Fine Adjustment of Trimming Tabs.* (*Pat. series No.* 4, 733,543.) (Arado, Flugsport, Vol. 35, No. 9, 19/5/43, p. 27.)
				Landing Gear and Brakes.
289	10639	G.B.	...	*Aeroplane Wheels.* (Aeroplane, Vol. 64, No. 1,670, 28/5/43, pp. 620-629.)
290	11007	U.S.A.	...	*Reducing Brake Drum and Wheel Rim Temperature.* (Autom. Ind., Vol. 88, No. 6, 15/3/43, pp. 358.)
291	11059	U.S.A.	...	*Non-Skid Wire Tread for Aircraft Tyres.* (Sci. Am., Vol. 168, No. 5, May, 1943, p. 224.)
292	11194	Germany	...	*Device for Mounting Float Seaplanes on a Trolley.* (*Pat. series No.* 3, 730,216.) (Bachmann, Flugsport, Vol. 35, No. 8, 21/4/43, p. 20.)
293	11206	Germany	...	*Contact Rod Height Indicator for Landing.* (*Pat. series No.* 3, 731,647.) (Nitzschte, Flugsport, Vol. 35, No. 8, 21/4/43, pp. 19-20.)
294	11322	Germany	...	*Automatic Deflation of Landing Wheel Tyres on Retraction and Subsequent Inflation when Lowered (Smaller Wing Housing).* (*Pat. series No.* 5, 732,327.) (Messerschmitt, Flugsport, Vol. 35, No. 10, 16/6/43, pp. 32-33.)
295	11323	Germany	...	*Spring Suspension of Snow Skids.* (*Pat. series No.* 5, 732,538.) (Henschel, Flugsport, Vol. 35, No. 10, 16/6/43, p. 33.)
296	11324	Germany	...	*Interconnection of Throttle and Tail Wheel Swivel Lock.* (*Pat. series No.* 5, 732,485.) (Henschel, Flugsport, Vol. 35, No. 10, 16/6/43, p. 33.)
297	11325	Germany	...	*Spring Mounting for Tail Wheel (Composite Rubber Metal).* (*Pat. series No.* 5, 733,131.) (Gotha, Flugsport, Vol. 35, No. 10, 16/6/43, pp. 33-34.)
298	11326	Germany	...	*Interconnection of Rudder and Tail Wheel Swivel Lock.* (*Pat. series No.* 5, 733,683.) (Fieseler, Flugsport, Vol. 35, No. 10, 16/6/43, p. 34.)
299	11327	Germany	...	*Arrangement of a Central Skid to Facilitate Landing.* (*Pat. series No.* 5, 732,486.) (Arado, Flugsport, Vol. 35, No. 10, 16/6/43, pp. 34-35.)
300	11328	Germany	...	*Retracting Landing Wheel Mechanism.* (Heinkel, Flugsport, Vol. 35, No. 10, 16/6/43, p. 35.)
301	11329	Germany	...	*Utilisation of Shock Absorber Deflections to Compress Fluid for Operating Brakes.* (*Pat. series No.* 5, 731,379.) (Elecktron, Flugsport, Vol. 35, No. 10, 16/6/43, pp. 35-36.)
302	11330	Germany	...	*Aerodynamic Tail Brake.* (*Pat. series No.* 5, 730,606.) (Dornier, Flugsport, Vol. 35, No. 10, 16/6/43, p. 36.)

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303	11331	Germany ...	*Snow Brake Applied to Skis.* (*Pat. series No.* 5, 731,811.) (Argus, Flugsport, Vol. 35, No. 10, 16/6/43, p. 36.)
304	11435	Germany ...	*Friction Brake.* (G. Niemann, Symposium of Papers on the Elements of Machine Design (Aachen), pp. 62-64.)
			De-icing.
305	11332	Germany ...	*Ice Warming Device* (*Photo-Electric*). (*Pat. series No.* 5, 731,905.) (German Government, Flugsport, Vol. 35, No. 10, 16/6/43, p. 36.)
306	11397	U.S.A. ...	*Double Wind Shield with Hot Air Space* (*Digest*). (R. L. McBrien, J.S.A.E., Vol. 51, No. 5, May, 1943, pp. 27-28.)
			ENGINES AND ACCESSORIES.
			Named Types.
307	10617	G.B.	*The 2,000 h.p. Napier 24-Cylinder, Liquid-Cooled, H Type Sabre Engine* (*Photograph*). (Aircraft Production, Vol. 5, No. 56, June, 1943, p. 302.)
308	10933	U.S.A. ...	*Allison Engine V 1,710 Performance.* (Inter. Avia., No. 856-857, 15/2/43, pp. 13-14.)
309	10937	G.B.	*Bristol Centaurus* (*8-Cylinder Twin-Row Radial* (~ 2,000 *h.p.*). (Inter. Avia., No. 856-857, 15/2/43, p. 19.)
310	10938	G.B.	*Sabre 24-Cylinder Sleeve Valve Engine Fitted to Typhoon.* (Inter. Avia., No. 856-857, 15/2/43, p. 19.)
311	10993	U.S.A. ...	*American Aircraft Engines* (*Index*). (Autom. Ind., Vol. 88, No. 6, 15/3/43, pp. 110-111.)
312	10994	U.S.A. ...	*American Gasoline Engines* (*Index*). (Autom. Ind., Vol. 88, No. 6, 15/3/43, pp. 112-121.)
313	10997	U.S.A. ...	*Small Gasoline Power Units* (10 *h.p. or less*) (*Index of American Types*). (Autom. Ind., Vol. 88, No. 6, 15/3/43, p. 126.)
314	11191	Germany ...	*B.M.W. 801 Aero Engine* (*Sectional Drawing*). (Flugsport, Vol. 35, No. 8, 21/4/43, p. 96.)
315	11452	U.S.A. ...	*Diagrammatic Layout of Two-Stage Supercharger in Merlin 61 Engine.* (Aviation, Vol. 42, No. 4, April, 1943, p. 187.)
316	11544	Germany ...	*German Automatic Supercharging System in Mercedes-Benz D.B. 601A* (*M.A.P. Report*). (Engineer, Vol. 176, No. 4,566, 16/7/43, pp. 48-49.)
			Design and Installation.
317	10846	U.S.A. ...	*Advantages of Air-Cooled Radial and Liquid-Cooled Inline Engines Installed in Modern American Aircraft.* (E. M. Lester, Pegasus, Vol. 1, No. 2, Feb., 1943, pp. 4-7 and 12-15.)
318	10976	G.B.	*Surface Finish and the Function of Parts—A Comparison of British and German Aero Engine Parts.* (G. Schlesinger, Engineer, Vol. 175, No. 4,560, 4/6/43, pp. 454-456.)
319	11207	Germany ...	*Tiltable Power Plant for Aircraft.* (*Pat. series No.* 3, 730,943.) (B.M.W., Flugsport, Vol. 35, No. 8, 21/4/43, p. 17.)

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320	11211	Germany ...	*Radiators Installed Inside Engine Cowling.* (*Pat. series No.* 3, 730,497.) (Arniot, Flugsport, Vol. 35, No. 8, 21/4/43, p. 18.)
321	11392	U.S.A. ...	*New Materials for Aircraft Engines.* (M. Young and H. H. Haninks, J.S.A.E., Vol. 51, No. 5, May, 1943, pp. 157-164.)
322	11403	U.S.A. ...	*Co-Designing Aircraft Power Plants* (*Digest*). (H. Karcher, J.S.A.E., Vol. 51, No. 5, May, 1943, p. 30.)
323	11404	U.S.A. ...	*General Aspects of Aircraft Power Plant Installations* (*Digest*). (T. Hammon, J.S.A.E., Vol. 51, No. 5, May, 1943, pp. 31-32.)
324	11434	Germany ...	*Development in Gear Design* (*with Discussion*). (O. Wolf, Symposium of Papers on the Elements of Machine Design (Aachen).)
325	11570	U.S.A. ...	*Pendulum Type Vibration Absorber* (*Discussion*). (A. H. Shieh, J. Aeron. Sci., Vol. 10, No. 4, April, 1943, p. 135.)
			Performance and Testing.
326	10516	G.B.	*Prevention of Valve Seizure.* (Engineer, Vol. 175, No. 4,558, 21/5/43, p. 416.)
327	10811	G.B.	*Some Recent Applications to Thermodynamics in Steam Engineering Research* (*Boiler Problems, Cavitation, Flow Through an Orifice De-aeration*). (R. S. Silver and others, Journal of Scientific Instruments, Vol. 20, No. 4, April, 1943, pp. 53-58.)
328	10879	G.B.	*Fuels and Internal Combustion Engine Performance.* (J. L. Beilschmidt, Aeronautics, Vol. 8, No. 4, May, 1942, pp. 48-54.)
329	11001	U.S.A. ...	*Portable Engine Test Stand* (*Photograph*). (Autom. Ind., Vol. 88, No. 6, 15/3/43, p. 140.)
330	11268	U.S.A. ...	*Breaking-in an Aero Engine.* (Engineer, Vol. 175, No. 4,563, 25/6/43, p. 505.)
331	11395	U.S.A. ...	*Mock Up Speeded Chevrolet Engine Test-Cell Project* (*Digest*). (P. A. Collins, J.S.A.E., Vol. 51, No. 5, May, 1943, pp. 25-26.)
332	11398	U.S.A. ...	*Improving the Fatigue Strength of Engine Parts* (*Digest*). (J. O. Almen, J.S.A.E., Vol. 51, No. 5, May, 1943, pp. 28-29.)
333	11671	U.S.A. ...	*High Speed Tests of Conventional Radial Engine Cowlings.* (R. G. Robinson and J. V. Becker, N.A.C.A. Report No. 745.)
334	11745	U.S.A. ...	*The Effect of Environment on Aircraft Engine Design and Performance.* (L. T. Miller, S.A.E. Preprint, Nat. Aeron. Meeting, April 8-9, 1943.)
			Diesel and Oil Engines.
335	10995	U.S.A. ...	*American Automotive Diesel and Other Heavy Oil Engines* (*Index*). (Autom. Ind., Vol. 88, No. 6, 15/3/43, pp. 122-125.)
336	11431	Germany ...	*The Stresses in the Transmission Gear and Bearings of High Speed Diesel Engines.* (D. Schmidt, Symposium of Papers on the Elements of Machine Design (Aachen), pp. 44-47.)

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			Turbines (Gas, Steam, Water).
337	10631	G.B. ...	... *Turbines and the Flying Wing.* (G. G. Smith, Flight, Vol. 43, No. 1,794, 13/5/43, pp. 496-498.)
338	10697	G.B. ...	... *Fabrication of Water Turbines.* (*H. Stone, Welding, March*, 1943, *pp.* 135-148.) (Met. Vick. Tech. News Bull., No. 859, 26/3/43, p. 4.)
339	10714	U.S.A.	... *The Mercury Vapour Process* (*Combined Mercury and Steam Turbines*). (A. R. Smith and E. S. Thompson, Trans. A.S.M.E., Vol. 64, No. 7, Oct., 1942, pp. 625-646.)
340	10715	U.S.A.	... *The Mercury Boiler.* (R. N. Hackett, Trans. A.S.M.E., Vol. 64, No. 7, Oct., 1942, pp. 647-656.)
341	10806	G.B. ...	... *New Gas Turbine Projects.* (Flight, Vol. 43, No. 1,793, 6/5/43, pp. 473-476.)
342	10834	Switzerland	... *Aerodynamic Test Engines* (*Closed Circuit*). (J. Ackeret and C. Keller, Escher Wyss, No. 15-16, 1942-1943, pp. 5-19.)
343	10835	Switzerland	... *Comparison of Aerodynamic* (*Closed Circuit*) *Turbines with Gas and Steam Turbines.* (C. Keller, Escher Wyss, No. 15-16, 1942-1943, pp. 20-41.)
344	10836	Switzerland	... *Rôle of Research in Turbine Design.* (C. Keller, Escher Wyss, No. 15-16, 1942-1943, pp. 42-53.)
345	10837	Switzerland	... *New Developments in Escher Wyss Steam Turbines.* (F. Flatt, Escher Wyss, No. 15-16, 1942-1943, pp. 54-61.)
346	10841	Switzerland	... 100 *Years Development of Water Turbines.* (J. Moser, Escher Wyss, No. 15-16, 1942-1943, pp. 101-119.)
347	10842	Switzerland	... *Researches on the Energy Consumed by Water Turbine Controls.* (H. Gerber, Escher Wyss, No. 15-16, 1942-1943, pp. 151-157.)
348	10838	Switzerland	... *Governors for Steam Turbines.* (A. Luthi, Escher Wyss, No. 15-16, 1942-1943, pp. 84-89.)
349	10898	Switzerland	... *Investigation of Water Turbines Regulators* (*from Schweizerische Bauzeitung, Vol.* 120, *No.* 2, 11/7/42.) (H. Gerber, Eng. Digest, Vol. 4, No. 1, Jan., 1943, pp.5-10.)
350	11091	Germany	... *The Experimental Determination of the Blade Temperature of Exhaust Gas Turbine Under Load.* (E. Graus, Luftwissen, Vol. 10, No. 4, April, 1943, pp. 110-113.)
351	10712	U.S.A.	... *Some Problems in the Selection and Operation of Centrifugal Pumps for Oil and Petrol Pipe Lines.* (A. Hollander, Trans. A.S.M.E., Vol. 64, No. 6, Aug., 1942, pp. 607-617.)
			Compressors, Pumps, Generators.
352	10710	U.S.A.	... *Energy Transfer Between a Fluid and a Rotor for Pump and Turbine Machinery* (*with Discussion*). (S. A. Moss and others, Trans. A.S.M.E., Vol. 64, No. 6, Aug., 1942, pp. 567-597.)

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353	10711	U.S.A. ...	*Comparative Characteristics of Fixed and Adjustable Blade Axial Flow Pumps, including Cavitation (with Discussion).* (J. D. Scoville, Trans. A.S.M.E., Vol. 64, No. 6, Aug., 1942, pp. 599-605.)
354	10721	U.S.A. ...	*Test Characteristics of a Combined Pump Turbine Model with Wicket Gates (with Discussion).* (R. V. Terry and others, Trans. A.S.M.E., Vol. 64, No. 8, Nov., 1942, pp. 731-744.)
355	10820	G.B.	*Large Wind Driven Synchronous Generators.* (T. F. Wall, Engineering, Vol. 155, No. 4,031, 28/5/43, pp. 421-423.)
356	11025	Germany ...	*Determination of the Lowest Natural Bending Frequency of Axial Flow Compressor Blades.* (M. Schilhansl, German Academy of Aeron. Research, Report No. 1, 1942, pp. 63-95.)
357	11049	G.B.	*Large Wind Driven Synchronous Generators (Contd.).* (T. F. Wall, Engineering, Vol. 155, No. 4,039, 11/6/43, pp. 461-463.)
358	11273	G.B.	*Large Wind Driven Synchronous Generators—II.* (T. F. Wall, Engineering, Vol. 155, No. 4,041, 25/6/43, pp. 501-503.)
			Cylinders, Bearings.
359	10964	G.B.	*The Quality of High Duty Bearings.* (M. H. Gall, Engineering Inspection, Vol. 7, No. 1, Jan.-March, 1942, pp. 26-30 and 32.)
360	11393	U.S.A. ...	*The Influence of Lubricating Oil Viscosity on Cylinder Wear.* (H. A. Everett, J.S.A.E., Vol. 51, No. 5, May, 1943, pp. 165-169.)
361	11401	U.S.A. ...	*Cooling Characteristics of Steel and Al. Tinned Cylinders for In-line Air-Cooled Engines.* (M. Piry, J.S.A.E., Vol. 51, No. 5, May, 1943, p. 37.)
362	11430	Germany ...	*Experiment on the Transmission of Pressure in a Lubricated Bearing.* (W. Pepper, Symposium of Papers on the Elements of Machine Design (Aachen), pp. 42-45.)
			Intercoolers, Oil Intakes.
363	11381	U.S.A. ...	*Intercoolers and Their Performance in Aircraft.* (S. K. Anderson and P. A. Scherer, Aviation, Vol. 42, No. 3, March, 1942, pp. 125-129 and 333-338.)
364	11399	U.S.A. ...	*Aircraft Oil Systems—High Altitude Problems (Digest).* (H. E. Moerman, J.S.A.E., Vol. 51, No. 5, May, 1943, pp. 29-30.)
365	11400	U.S.A. ...	*Intake Systems for Aircraft Engines (Digest).* (C. T. Doman, J.S.A.E., Vol. 51, No. 5, May, 1943, pp. 36-37.)
366	11683	G.B.	*Engine Oil Filtration and its Effects on Wear in Internal Combustion Engines.* (T. W. Langley, Mech. World, Vol. 114, No. 2,949, 9/7/43, pp. 37-39 and 48.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
			Starters.
367	10651	G.B. ...	... *An Aeroplane Starter for Electrically Started Aeroplane Engines.* (Aeroplane, Vol. 64, No. 1,669, 21/5/43, p. 602.)
368	11183	U.S.A.	... *Portable Electric Starter Unit for Aircraft.* (Autom. Ind., Vol. 88, No. 7, 1/4/43, p. 43.)
369	11391	U.S.A.	... *Storage Battery Performance at Low Temperatures (Engine Starting).* (J. H. Little and R. A. Daily, J.S.A.E., Vol. 51, No. 5, May, 1943, pp. 149-156 and 164.)
			FUELS AND LUBRICANTS.
			High Octane and Aviation Fuels.
370	10988	G.B. ...	... *Fuel Research Intelligence Section.* (Fuel Research Station, Summary for Two Weeks ending 8th and 15th May, 1943.)
371	11242	U.S.A.	... *Gas Analysis by Means of Spectrometer (Applied to the Manufacture of High Octane Fuels).* (Sci. Am., Vol. 168, No. 6, June, 1943, p. 254.)
372	11464	U.S.A.	... *New Aviation Fuel Processes.* (Aviation, Vol. 42, No. 4, April, 1943, p. 301.)
			Gaseous Fuels.
373	10821	Germany	... *German Portable Gas Producer Practice.* (Engineering, Vol. 155, No. 4,031, 28/5/43, pp. 423-425.)
374	11045	G.B. ...	... *Producer Gas Tests on a Petrol Engine.* (Engineering, Vol. 155, No. 4,039, 11/6/43, p. 465.)
375	11543	G.B. ...	... *Storage of Liquefied Natural Gas.* (Engineer, Vol. 176, No. 4,566, 16/7/43, p. 48.)
			Lubrication.
376	10760	U.S.A.	... *Lubricants and Their Dimensional Value in Gear Design (Paper Presented to S.A.E.).* (J. O. Almen, Autom. Eng., Vol. 33, No. 435, April, 1943, pp. 147-153.)
377	11018	U.S.A.	... *Boundary Lubrication.* (Metal Progress, Vol. 43, No. 4, April, 1943, pp. 582-584.)
378	11302	G.B. ...	... *Lubricants from Tree Stumps.* (Engineer, Vol. 176, No. 4,564, 2/7/43, p. 11.)
379	11429	Germany	... *Boundary Lubrication (with Extensive Bibliography).* (H. Donandt, Symposium of Papers on the Elements of Machine Design (Aachen), 1935, pp. 33-41.)
380	11432	Germany	... *Lubrication of Railway Axles.* (D. Garhers, Symposium of Papers on the Elements of Machine Design (Aachen), pp. 47-49.)
			Oil Testing.
381	11580	U.S.A.	... *A Versatile Oil-Testing Cell of Novel Design for Use in Determining Electrical Properties of Insulating Oils (Liquid Dielectrics, etc.).* (T. Hayen, Rev. of Sci. Instrum., Vol. 14, No. 5, May, 1943, pp. 141-143.)

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THEORY OF ELASTICITY.

Stresses.

382	10897	G.B.	*Code for Working Stresses—Pt. I.* (J. Marin, Eng. Digest, Vol. 4, No. 1, Jan., 1943, pp. 2-5.)
383	11048	G.B.	*Stress Due to Collapse of Vapour Bubbles in a Liquid (Contd.).* (R. S. Silver, Engineering, Vol. 155, No. 4,039, 11/6/43, p. 474.)
384	11081	G.B.	*Stress Due to Collapse of Vapour Bubbles in a Liquid.* (M. Reiner, Engineering, Vol. 155, No. 4,038, 4/6/43, p. 454.)
385	11166	G.B.	*Stress Due to the Collapse of Vapour Bubbles in a Liquid.* (V. R. Evans, Engineering, Vol. 155, No. 4,040, 18/6/43, p. 494.)
386	11167	G.B.	*Cracking of Loads Under Tensile Load.* (G. Roberts, Engineering, Vol. 155, No. 4,040, 18/6/43, p. 495.)
387	11228	G.B.	*A Note on Stress Systems in Aeleotropic Materials —I and II.* (A. E. Green, Phil. Mag., Vol. 34, No. 233, June, 1943, pp. 416-422.)
388	11425	Germany ...	*Influence of Non-Uniform Stress Distribution on the Strength of Materials.* (W. Kunzle, Symposium of Papers on the Elements of Machine Design (Aachen), 1935, pp. 3-16.)
389	11426	Germany ...	*Example of Modern Stress Calculation.* (E. Lehr, Symposium of Papers on the Elements of Machine Design (Aachen), 1935, pp. 17-23.)
390	11427	Germany ...	*Model Experiments on Stress Distribution in Section Undergoing Torsion and Discussion.* (W. Bautz, Symposium of Papers on the Elements of Machine Design (Aachen), 1935, pp. 23-27 and 28-33.)

Strength of Wooden Beams, etc.

391	10843	Switzerland ...	*Strength Investigations on Spiral Diffusions.* (F. Salzmann and A. Suss, Escher Wyss, No. 15-16, 1942-1943, pp. 164-169.)
392	11029	G.B.	*Structure and Breaking Strength of Plastic Mouldings (from Schweizer Archiv., 1943, No. 9, p. 55.)* (G. O. Grimm, Vol. 7, No. 73, June, 1943, pp. 251-257.)
393	11089	Germany ...	*Strength Characteristics of Some Wooden Structural Elements Taken from Captured Russian Aircraft.* (J. T. Heiner, Luftwissen, Vol. 10, No. 4, April, 1943, pp. 103-104.)
394	11262	U.S.A. ...	*Bending Strength in the Plastic Range.* (F. P. Cozzone, J. of Aeron. Sci., Vol. 10, No. 5, 1943, pp. 137-151.)
395	11574	Germany ...	*Stress Distribution in Thin Walled Conical Beams.* (A. Pfluger, Z.A.M.M., Vol. 22, No. 2, April, 1942, pp. 99-116.)
397	11682	G.B.	*The Strength of Timber Beams.* (Mech. World, Vol. 114, No. 2,949, 9/7/43, pp. 35-36.)

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			Photo-Elasticity.
398	10731	U.S.A. ...	*The Fundamentals of Photo-Elastic Stress Analysis Applied to Dynamic Stresses.* (W. N. Findley, Eastern Photo-Elasticity Conference, 9th Semi-Annual Meeting, 13/5/39, pp. 1-11.)
399	10732	U.S.A. ...	*Gelatin Models.* (T. R. Cuykendall, Eastern Photo-Elasticity Conference, 9th Semi-Annual Meeting, 13/5/39, pp. 13-15.)
400	10733	U.S.A. ...	*Three Dimensional Photo-Elastic Analysis by Scattered Light.* (R. Weller, Eastern Photo-Elasticity Conference, 9th Semi-Annual Meeting, 13/5/39, pp. 19-21.)
401	10734	U.S.A. ...	*Preparation of Photo-Elastic Models.* (M. L. Price, Eastern Photo-Elasticity Conference, 9th Semi-Annual Meeting, 13/5/39, pp. 23-26.)
402	11085	U.S.A. ...	*Theory of Large Elastic Deformations (Rubber).* (L. R. G. Treloar, Nature, Vol. 151, No. 3,839, 29/5/43, p. 616.)
403	11145	G.B.	*Seeing Strains and Stresses Inside all Material with "Photo-Elasticity."* (British Plastics, Vol. 15, No. 169, June, 1942, pp. 18-20.)
			Creep Tests.
404	10674	G.B.	*Precision in Creep Testing.* (*J. H. Fellows and others, Metals Technology, Aug., 1942, pp. 1-15.*) (Met. Vick. Tech. News Bull., No. 837, 23/10/42, p. 5.)
405	10725	U.S.A. ...	*Report on Tubular Creep Tests (Internal Pressure).* (F. H. Norton and C. R. Soldberg, Trans. A.S.M.E., Vol. 64, No. 8, Nov., 1942, pp. 769-777.)
406	10828	U.S.A. ...	100,000 *Hours Creep Tests on Alloy Steels.* (Sci. Am., Vol. 168, No. 2, Feb., 1943, p. 61.)
407	11300	G.B.	*Creep Resistance of Superheater Tube Steels in Tube and Bar Form.* (J. A. Jones and W. E. Bardgett, Engineer, Vol. 176, No. 4,564, 2/7/43, pp. 6-8.)
			Fatigue Tests.
408	10682	G.B.	*Behaviour of Spot Welds Under Fatigue Stress.* (*A. M. Unger and others, Weld. J., March, 1942, pp. 1,355-1,425.*) (Met. Vick. Tech. News Bull., No. 864, 30/4/43, p. 2.)
409	10960	G.B.	*Fatigue Tests on Some Copper Alloys.* (H. R. Anderson and C. S. Smith, Engineering Inspection, Vol. 7, No. 2, April-June, 1942, pp. 15-21.)
410	11254	U.S.A. ...	*Fatigue Failures in Common Machine Parts.* (J. O. Almen, Metal Progress, Vol. 43, No. 5, May, 1943, pp. 737-740.)
			MATERIALS (PROPERTIES, FABRICATION, INSPECTION).
			A. Properties.
			Al. and Mg. Alloys.
411	10759	G.B.	*The Properties of Various Wrought Al. Alloys.* (Autom. Eng., Vol. 33, No. 435, April, 1943, pp. 145-146.)

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412	10899	Germany	...	*The Strength of Al.-Mg. Alloys at the Temperature of Liquid Oxygen (from Zeitschrift für die gesamte Kälte-Industrie, Vol. 49, No. 6, 1942, pp. 71-72).* (H. Maeder, Eng. Digest, Vol. 4, No. 1, Jan., 1943, pp. 10-11.)
413	10922	Japan	...	*A New Magnesium Alloy.* (Inter. Avia., No. 856-857, 15/2/43, p. 10.)
414	10923	Japan	...	*Al. and Mg. Production in Japan.* (Inter. Avia., No. 856-857, 15/2/43, p. 11.)
415	11287	G.B. ...	...	*Protective Treatment of Magnesium Alloys.* (Metal Industry, Vol. 63, No. 1, 2/7/43, p. 8.)
416	11304	G.B. ...	...	*Aluminium in Post-War Reconstruction—I.* (R. Hammond, Engineer, Vol. 176, No. 4,564, 2/7/43, pp. 15-16.)
417	11417	G.B. ...	...	*Metallographic Technique for Magnesium Alloys.* (F. A. Fox and H. T. Hall, Metal Industry, Vol. 62, No. 25, 18/6/43, pp. 391-392.)
418	11656	U.S.A.	...	*High Strength Natural Ageing Al. Alloy.* (H. Brown, Aero Digest, Vol. 42, No. 5, May, 1943, pp. 209-210, 296 and 333.)
				Iron and Steel.
419	10778	U.S.A.	...	*Sources of Hydrogen in Steel and Means for its Elimination.* (C. H. Zapffe, Metal Progress, Vol. 43, No. 3, March, 1943, pp. 397-401.)
420	10780	U.S.A.	...	*Weldability of N.E. 1,330 and N.E. 1,335 (Laboratory Tests).* (O. E. Harder and C. B. Voldrich, Metal Progress, Vol. 43, No. 3, March, 1943, pp. 409-410.)
421	10782	U.S.A.	...	*Properties of Important Wrought Chromium Nickel-Iron Alloys (Data Sheet).* (Metal Progress, Vol. 43, No. 3, March, 1943, p. 412a.)
422	10965	G.B. ...	...	*The Interpretation of Steel Specifications.* (E. Gregory, Engineering Inspection, Vol. 7, No. 3, Autumn, 1942, pp. 4-7.)
423	11008	U.S.A.	...	*Machinability of National Alloy Steels.* (O. W. Boston, Metal Progress, Vol. 43, No. 4, April, 1943, p. 543.)
424	11011	U.S.A.	...	*Tests on N.E. 8,630 Steels for Welded Air Frames.* (M. Hill, Metal Progress, Vol. 43, No. 4, April, 1943, pp. 555-559.)
425	11012	U.S.A.	...	*Properties of Important Wrought Chromium-Iron Alloy (Data Sheet).* (Metal Progress, Vol. 43, No. 4, April, 1943, p. 560a.)
426	11014	U.S.A.	...	*Under-Hardening of Steel—Possible Applications.* (Metal Progress, Vol. 43, No. 4, April, 1943, p. 570.)
427	11076	G.B. ...	...	*Research on Cast Iron.* (Engineering, Vol. 155, No. 4,038, 4/6/43, p. 445.)
428	11248	U.S.A.	...	*Aluminium Covered Sheet Steel.* (Sci. Am., Vol. 168, No. 6, June, 1943, p. 279.)
429	11249	U.S.A.	...	*National Emergency Steels (N.E. 1,300 Series).* (Metal Progress, Vol. 43, No. 5, pp. 711-715.)

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430	11253	U.S.A. ...	*Mechanical Properties of N.E., S.A.E., and Other Hardened Steels.* (W. G. Patton, Metal Progress, Vol. 43, No. 5, May, 1943, pp. 726-733.)
			Non-Ferrous Metals.
431	10777	U.S.A. ...	*Substitute for 90 Cu., 10 Sn. Bearings.* (M. F. Garwood and E. H. Stilwill, Metal Progress, Vol. 43, No. 3, March, 1943, p. 396.)
432	10780	U.S.A. ...	*Down Grading Chart for Brass and Bronze Castings.* (C. S. Cole, Metal Progress, Vol. 43, No. 3, March, 1943, pp. 406-408.)
433	10808	Germany ...	*German Copper Shortage.* (Flight, Vol. 43, No. 1,793, 6/5/43, p. 480.)
434	10977	G.B.	*The Uses of Lead in Wartime.* (Metal Industry, Vol. 62, No. 23, 4/6/43, p. 353.)
435	10980	G.B.	*Ingot Brass and Bronze.* (W. Romanoff, Metal Industry, Vol. 62, No. 23, 4/6/43, pp. 357-358.)
436	11019	U.S.A. ...	*Influence of Cast Structure on Mechanical Properties of Non-Ferrous Alloys.* (Metal Progress, Vol. 43, No. 4, April, 1943, pp. 586-590.)
437	11064	G.B.	*Zinc Loss in Brass.* (Metal Industry, Vol. 62, No. 24, 11/6/43, p. 374.)
438	11162	U.S.A. ...	*Physical Properties and Thermal Treatment of K. Monel.* (Review of Sci. Insts., Vol. 14, No. 3, March, 1943, p. 82.)
439	11232	G.B.	*Sources and Uses of Beryllium.* (Engineering, Vol. 156, No. 4,042, 2/7/43, p. 10.)
440	11286	G.B.	*Non-Ferrous Secondary Metals.* (F. W. Willard, Metal Industry, Vol. 63, No. 1, 2 July, 1943, pp. 6-8.)
441	11605	U.S.A. ...	*Thermal Expansion of Bronzes (Tin-Zinc, Leaded, Aluminium and Silicon Bronzes).* (P. Hidnert, J. Res. Bur. Stands., Vol. 30, No. 1, Jan., 1943, pp. 75-88.)
			Plastics and Resins.
442	10614	G.B.	*Manufacturing Technique for Plastic Materials.* (Aircraft Production, Vol. 5, No. 56, June, 1943, pp. 299-301.)
443	10621	Germany ...	*German Production of Artificial Fibre.* (Flight, Vol. 43, No. 1,795, 20/5/43, p. 520.)
444	10650	G.B.	*Plastic Panels and Dials.* (Aeroplane, Vol. 64, No. 1,669, 21/5/43, p. 602.)
445	10693	G.B.	*Acrylate and Vinyl Chloride Resin Dispersion.* (A. Renfrew and C. F. Flint, Ind. Chem., April, 1943, pp. 194-198.) (Met. Vick. Tech. News Bull., No. 863, 23/4/43, p. 9.)
446	10701	G.B.	*Paper Condensers. (M. Brotherton, Bell Laboratory Record, Jan., 1943, pp. 123-126.)* (Met. Vick. Tech. News Bull., No. 859, 26/3/43, p. 8.)
447	10829	U.S.A. ...	*Flame Proof Plastic Laminated Cotton Cloth (Light Weight).* (Sci. Am., Vol. 168, No. 2, Feb., 1943, p. 62.)
448	10831	U.S.A. ...	*Lignum Insulating Material from Paper Waste.* (Sci. Am., Vol. 168, No. 2, Feb., 1943, pp. 84-85.)

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449	10904	Germany	...	*Strength of Plastic Mouldings from Composite Materials (from Kunststoffe, Vol. 32, No. 1, Jan., 1942, pp. 1-9.)* (H. R. Jacobi, Eng. Digest, Vol. 4, No. 1, Jan., 1943, pp. 21-24.)
450	11026	G.B.	...	*Metalizing Plastics.* (E. E. Halls, Plastics, Vol. 7, No. 73, June, 1943, pp. 235-243.)
451	11027	G.B.	...	*Spraying of Plastics.* (Plastics, Vol. 7, No. 73, June, 1943, p. 243.)
452	11028	G.B.	...	*Synthetic Resins Used in the Mosquito.* (Plastics, Vol. 7, No. 73, June, 1943, p. 246.)
453	11031	Germany	...	*Sawing of Laminated Plastics (from Der Betrieb, Aug., 1942).* (Plastics, Vol. 7, No. 73, June, 1943, p. 258.)
454	11036	G.B.	...	*Resinoids and Other Plastics as Film Formers. XIX—Electrolyte Aspects of High Polymeric Systems.* (B. J. Brajnikoff, Plastics, Vol. 7, No. 73, June, 1943, pp. 268-276.)
455	11043	G.B.	...	*The Practical Use of Plastics in Building and Structural Work.* (Chem. and Ind., Vol. 62, No. 24, 12/6/43, p. 226.)
456	11050	U.S.A.	...	*Coal as Raw Material for Plastics, etc.* (J. K. Hunt, Sci. Am., Vol. 168, No. 5, May, 1943, pp. 196-198.)
457	11060	U.S.A.	...	*Soybean Plastics.* (Sci. Am., Vol. 168, No. 5, May, 1943, p. 221.)
458	11143	G.B.	...	*Heatronic Moulding—A New Technique for Rapid Moulding of Thermo-Setting Plastics.* (V. E. Meharg, British Plastics, Vol. 15, No. 169, June, 1942, pp. 6-13.)
459	11144	G.B.	...	*Plastics in the Services.* (British Plastics, Vol. 15, No. 169, June, 1942, pp. 14-17.)
460	11146	G.B.	...	*Plastics in Surgery.* (British Plastics, Vol. 15, No. 169, June, 1942, p. 22.)
461	11148	G.B.	...	*Machinery for "Igelit" Resins.* (British Plastics, Vol 15, No. 169, June, 1943, p. 28.)
462	11149	G.B.	...	*New Plastics to Make Dies, Jigs and Forming Blocks.* (British Plastics, Vol. 15, No. 169, June, 1943, p. 29.)
463	11152	U.S.A.	...	*Position of Different Type Plastics in U.S.A.* (British Plastics, Vol. 15, No. 169, June, 1943, pp. 40 and 50.)
464	11154	U.S.A.	...	*Saflex-Coated Fabric.* (C. T. King, British Plastics, Vol. 15, No. 169, pp. 43-45.)
465	11156	G.B.	...	*Plastic Hinges Used in the U.S. Army.* (British Plastics, Vol. 15, No. 169, June, 1943, p. 50.)
466	11160	U.S.A.	...	*Extruded Plastic Tubing for Insulators and Wire Markers.* (Review of Sci. Insts., Vol. 14, No. 3, March, 1943, pp. 81-82.)
467	11171	U.S.A.	...	*Plastic Fuse.* (Ind. and Eng. Chem. (News Ed.), 10/5/43, p. 706.)
468	11187	U.S.A.	...	*Drill Jig Made of Durez Casting Resin.* (Autom. Ind., Vol. 88, No. 7, 1/4/43, p. 43.)
469	11243	U.S.A.	...	*Thermo Plastic for Dies and Jigs.* (Sci. Am., Vol. 168, No. 6, June, 1943, pp. 254-255.)

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470	11589	G.B. ...	... *Practical Use of Plastics in Building and Structural Work.* (Plastics, Vol. 7, No. 74, July, 1943, p. 286.)
471	11590	Germany	... *Routine Working of Polyvinyl Chloride and Polyisobutylene.* (*Digest of Kunststoffe, Vol.* 32, *p.* 307, 1942.) (Klant, Plastics, Vol. 7, No. 74, July, 1943, pp. 287-291.)
472	11592	Germany	... *Curing of Synthetic Resin Wood Adhesives by Resistance Heating.* (*Mitt d. Fachausschusses für Holzfragen, No.* 29, 1941, *pp.* 65-84.) (Egner, Plastics, Vol. 7, No. 74, July, 1943, p. 293.)
473	11699	U.S.A.	... *Plastics from Redwoods.* (H. F. Lewis, A.S.M.E. Preprint, April 26-28, 1943.)
			Rubber (Nat. and Syn.).
474	10761	G.B. ...	... *Rubber Mouldings* (*Relt Mouldings*). (Autom. Eng., Vol. 33, No. 435, April, 1943, p. 154.)
475	10809	Germany	... *Rubber Yielding Plants to Increase German Rubber Supply.* (Flight, Vol. 43, No. 1,793, 6/5/43, p. 480.)
476	10864	U.S.A.	... *U.S. Natural Rubber Production Programme.* (Sci. Am., Vol. 168, No. 4, April, 1943, pp. 172-173.)
477	11147	G.B. ...	... *A New Rubber Substitute* (*from Soya Bean*). (British Plastics, Vol. 15, No. 169, June, 1943, p. 24.)
478	11158	U.S.A.	... *Machining Rubber on a Lathe.* (S. A. Weissenburger, Rev. of Sci. Insts., Vol. 14, No. 3, March, 1943, p. 77.)
479	11164	G.B. ...	... *Modern Synthetic Rubber* (*Book Review*). (H. Barron, Engineering, Vol. 155, No. 4,040, 18/6/43, p. 483.)
480	11410	U.S.A.	... *A New Type of Synthetic Rubber* (*Witcogum*). (Ind. and Eng. Chem., Vol. 21, No. 8, 25/4/43, p. 560.)
481	11593	G.B. ...	... *Resistance of Neoprene to Various Refrigerating Agents.* (Lawrence, Plastics, Vol. 7, No. 74, July, 1943, pp. 293-294.)
482	11606	U.S.A.	... *Synthetic Rubber—Survey.* (H. L. Fisher, Industrial Engineering and Chem. (News Ed.), Vol. 21, No. 10, 25/5/43, pp. 741-750.)
483	11611	U.S.A.	... *Synthetic Rubber for Balloons.* (Ind. and Eng. Chem. (News Ed.), Vol. 21, No. 10, 25/5/43, p. 782.)
484	11619	U.S.A.	... *Hydraulic Efficiency of Rubber Pads.* (W. Tucker, Aviation, Vol. 42, No. 5, May, 1943, pp. 167-169 and 360.)
485	11740	G.B. ...	... *Compounding Natural and Synthetic Rubbers to Resist Low Temperatures.* (The Services Rubber Investigations, Manufacturers' Memorandum No. M.5.)
			Wood and Plywood.
486	10694	G.B. ...	... *The Characteristics of Bakelised Wood.* (*A. E. L. Jervis, Electrical Times,* 15/4/43, *pp.* 428-431.) (Met. Vick. Tech. News Bull., No. 863, 23/4/43, p. 10.)

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487	10849	U.S.A. ...	*Fatigue Characteristics of Natural and Resin-Impregnated, Compressed, Laminated Woods.* (F. B. Fuller and T. T. Oberg, J. Aeron. Sci., Vol. 10, No. 3, March, 1943, pp. 81-85.)
488	10858	U.S.A. ...	*New Bonded Plywood (Compregwood).* (Sci. American, Vol. 168, No. 4, April, 1943, pp. 157-158.)
489	10968	G.B.	*Tests of Glued Laminated Wood Beams Impregnated with Creosote.* (W. A. Oliver, Engineering Inspection, Vol. 7, No. 3, Autumn, 1942, pp. 16-22.)
490	11037	G.B.	*Plywood Motor Car Body (Photo).* (Plastics, Vol. 7, No. 73, June, 1943, p. 276.)
491	11058	U.S.A. ...	*Dye Made by Chemical Treatment of Sawdust.* (Sci. Am., Vol. 168, No. 5, May, 1943, pp. 223-224.)
492	11151	G.B.	*The Importance of Moisture Content in Wood.* (British Plastics, Vol. 15, No. 169, June, 1943, p. 27.)
493	11217	G.B.	*Identification of Indian Timbers.* (Nature, Vol. 151, No. 3,841, 12/6/43, p. 669.)
494	11259	U.S.A. ...	*Timber for Photomicrography.* (Metal Progress, Vol. 43, No. 5, May, 1943, p. 747.)
495	11306	U.S.A. ...	*Prefabricated Plywood and Timber—I. Beam to Replace Steel ("Timbeam").* (Engineer, Vol. 176, No. 4,564, 2/7/43, p. 19.)
496	11478	U.S.A. ...	*Types of American Plywoods.* (Inter. Avia., No. 867, 1/5/43, p. 18.)
497	11704	U.S.A. ...	*Some Observations on Density and Shrinkage of Ponderosa Pine Wood.* (R. A. Cockrell, A.S.M.E. Preprint, April 26-28, 1943.)
			Diamonds, Glass Ceramics.
498	10860	U.S.A. ...	*Diamond-Charged Lens Grinding Tools for Precision Optics.* (Sci. American, Vol. 168, No. 4, April, 1943, p. 159.)
499	11033	G.B.	*Insulating Media for Conduit and Cable (from Schweizer Archiv., No. 9, p. 37, 1943).* (Plastics, Vol. 7, No. 73, June, 1943, p. 259.)
500	11034	Germany ...	*Safety Glass Intermediate (from Kolloid Z., Vol. 98, pp. 117 and 376).* (Plastics, Vol. 7, No. 73, June, 1943, p. 259.)
501	11041	G.B.	*Foam Glass.* (Engineer, No. 175, No. 4,561, 11/6/43, p. 476.)
502	11080	G.B.	*Glass Fabric for Electrical Insulation.* (Engineering, Vol. 155, No. 4,038, 4/6/43, p. 452.)
503	11161	U.S.A. ...	*New Compact Ceramic Condenser.* (Rev. of Sci. Insts., Vol. 14, No. 3, March, 1943, pp. 81-82.)
504	11244	U.S.A. ...	*New Glass Process for Complicated Insulators (Cold Moulding followed by Fusing).* (Sci. Am., Vol. 168, No. 6, June, 1943, p. 255.)
505	11337	Germany ...	*Plexiglass—Properties and Fabrication (Ref. Sheet No. 7-8).* (Flugsport, Vol. 35, No. 9, 19/5/43, pp. 112a-b.)

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506	11407	U.S.A.	...	*Extending the Life of Chemical Glassware.* (E. J. Lewis, Ind. and Eng. Chem., Vol. 21, No. 8, 25/4/43, pp. 552-554.)
507	11564	U.S.A.	...	*Glass Jewels for Instrument Bearings.* (Rev. of Sci. Instrum., Vol. 14, No. 4, April, 1943, p. 121.)
508	11586	U.S.A.	..	*A Ceramic "Replacement" Material (Prestite).* (Rev. of Sci. Instrum., Vol. 14, No. 5, May, 1943, p. 155.)
509	11587	U.S.A.	...	*Multiform Glassware for Electrical Insulator.* (Rev. of Sci. Instruments, Vol. 14, No. 5, May, 1943, pp. 155-156.)
510	11596	Germany	...	*Course of Fracture in Plexiglass.* (*Z. Techn. Physik., Vol.* 21, 1940, *p.* 393.) (Elle and Smith, Plastics, Vol. 7, No. 74, July, 1943, p. 294.)
				Solders and Bearing Materials.
511	11004	U.S.A.	...	*Bearing Alloys with Low Tin Content.* (Autom. Ind., Vol. 88, No. 6, 15/3/43, p. 186.)
512	11065	G.B. ...	...	*Tin Conserving Solders.* (G. F. Read, Metal Industry, Vol. 62, No. 24, 11/6/43, pp. 375-377.)
513	11415	G.B. ...	...	*Lead - Arsenic - Antimony Soft Solder.* (R. L. Dowdell and others, Metal Industry, Vol. 62, No. 25, 18/6/42, pp. 389-390.)
514	11421	G.B. ...	...	*Brazing and Soldering.* (R. N. Chaplin, Metal Industry, Vol. 62, No. 25, 18/6/43, p. 395.)
				Miscellaneous (Cements, Varnishes, etc.).
515	10708	G.B. ...	...	*Heat-Setting Varnishes.* (*S. L. Moses, Railway Elect. Eng., Dec.*, 1942, *pp.* 263-266 *and* 281.) (Met. Vick. Tech. News Bull., No. 854, 19/2/43, p. 9.)
516	10758	G.B. ...	...	*Heat Sensitive Crayons.* (Autom. Eng., Vol. 33, No. 435, April, 1943, p. 136.)
517	10763	G.B. ...	...	*Cemented Carbides (Review of Development).* (Autom. Eng., Vol. 33, No. 435, April, 1943, pp. 161-164.)
518	10859	U.S.A.	...	*Corrugated Asphalt Siding to Replace Corrugated Steel.* (Sci. Amer., Vol. 168, No. 4, April, 1943, p. 159.)
519	11077	Canada	...	*Canadian War-Time Concrete Pavements.* (Engineering, Vol. 155, No. 4,038, 4/6/43, p. 446.)
520	11153	U.S.A.	...	*Extensive Use of Casein Glues in U.S.A.* (British Plastics, Vol. 15, No. 169, June, 1943, p. 42.)
521	11234	G.B. ...	...	*Concrete Pavings in Low Temperatures.* (Engineering, Vol. 156, No. 4,042, 2/7/43, pp. 16-17.)
522	11277	G.B. ...	...	*Three-Pin Reinforced Concrete Frame Buildings.* (Engineering, Vol. 155, No. 4,041, 25/6/43, pp. 506-507.)
523	11290	G.B. ...	...	*Plaster-Asbestos Moulds.* (Metal Industry, Vol. 63, No. 1, 2/7/43, p. 9.)
524	11584	U.S.A.	...	*A New Laboratory Cement.* (Rev. of Sci. Instrum., Vol. 14, No. 5, May, 1943, p. 154.)
525	11594	Germany	...	*Lacquered Wire in Telephone Engineering (from Electr. Nachs. Techn.*, 1941, *Vol.* 18.) (Wolff and Pohler, Plastics, Vol. 7, No. 74, July, 1943, p. 294.)

ITEM NO.	R.T.P. REF.			TITLE AND JOURNAL.
				B. Fabrication.
				Welding.
526	10676	G.B.	... ...	*Stud Welding System.* (*A. M. Candy, Welding Journal, Aug., 1942, pp.* 509-512.) (Met. Vick. Tech. News Bull., No. 837, 23/10/42, p. 8.)
527	10677	G.B.	... ...	*Redesign of Cast Iron Machine Parts for Welding Construction Reasons and Principles.* (*F. Koenigsberger, Welder, Jan.-June*, 1942, *pp.* 266-269.) (Met. Vick. Tech. News Bull., No. 837, 23/10/42, p. 9.)
528	10678	G.B.	... ...	*Proposed Specifications for Stainless Steel Arc Welding Electrodes for Welding Steels of High Hardenability.* (*Welding Journal, Aug.*, 1942, *pp.* 513-514.) (Met. Vick. Tech. News Bull., No. 837, 23/10/42, p. 11.)
529	10679	G.B.	... ...	*Arc Welding Aircraft Tubing.* (*Welding Engineer, Aug.*, 1942, *pp.* 35-37.) (Met. Vick. Tech. News Bull., No. 837, 23/10/43, p. 12.)
530	10680	G.B.	... ...	*Current Measurement Improves Welding Technique —Pt. II.* (*C. M. Manyer and H. S. Day, Welding Eng., Aug.*, 1942, *pp.* 39-41.) (Met. Vick. Tech. News Bull., No. 837, 23/10/43, p. 12.)
531	10681	G.B.	... ...	*Metallic Arc Welding of Copper Pressure Vessels.* (*G. H. Sandberg, Welding Journal, Aug.*, 1942, *pp.* 507-509.) (Met. Vick. Tech. News Bull., No. 837, 23/10/42, p. 7.)
532	10689	G.B.	... ...	*New Stud Welding Process.* (*Welding Engineer, Dec.*, 1942, *p.* 42.) (Met. Vick. Tech. News Bull., No. 856, 5/3/43, p. 3.)
533	10690	G.B.	... ...	*Welding of Stainless Steel.* (*S. L. Rich, Welding J., June*, 1942, *pp.* 293*S*-296*S*.) (Met. Vick. Tech. News Bull., No. 856, 5/3/43, p. 4.)
534	10691	G.B.	... ...	*Device for Measuring Tip Force and Current in Spot Welding.* (*H. Wolfe and R. W. Powell, Welding Journal, June*, 1942, *pp.* 293*S*-296*S*.) (Met. Vick. Tech. News Bull., No. 856, 5/3/43, p. 4.)
535	10692	G.B.	... ...	*Clad Steel "Sandwiches" welded by the Carbon Arc.* (*T. S. Fitch and L. W. Townsend, Iron Age*, 18/2/43, *pp.* 54-59.) (Met. Vick. Tech. News Bull., No. 863, 23/4/43, p. 8.)
536	10707	G.B.	... ...	*Welding by Unionmelt Process.* (*Westinghouse Engineer, Nov.*, 1942, *pp.* 126-128.) (Met. Vick. Tech. News Bull., No. 854, 19/2/43, p. 6.)
537	10769	G.B.	... ...	*The Reclamation of Cutting Tools by Arc Welding.* (J. R. Treadwell, Machinery, Vol. 62, No. 1,595, 6/5/43, pp. 494-496.)
538	10814	Germany	...	*The Gussolite Process for the Temperature Welding of Cast Iron.* (Welding Industry, Vol. 2, No. 5, June, 1934, pp. 163-165.)
539	11021	U.S.A.	...	*World's Largest Machine for Spot Welding Aluminium.* (Metal Progress, Vol. 43, No. 4, April, 1943, p. 616.)

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540	11078	G.B.	*Structural Design of Welded Hulls.* (J. Turnbull, Engineering, Vol. 155, No. 4,038, 4/6/43, pp. 447-448.)
541	11150	G.B.	*Spot Welding with Glue.* (British Plastics, Vol. 15, No. 169, June, 1943, p. 27.)
542	11241	U.S.A. ...	*Magnesium Welding with the Helium Arc.* (S. R. Winter, Scientific American, Vol. 168, No. 6, June, 1943, pp. 252-254.)
543	11267	U.S.A. ...	*Shipyard Layout for Welded Construction.* (Engineer, Vol. 175, No. 4,563, 25/6/43, pp. 504-505.)
544	11296	G.B.	*Removing Welding Flux from Aluminium.* (Metal Industry, Vol. 62, No. 26, 25/6/43, p. 406.)
			Surface Treatment (Plating, etc.).
545	10872	U.S.A. ...	*Surbrite—A New Steel Surface Conditioner.* (Sci. Am., Vol. 168, No. 4, April, 1943, p. 185.)
546	10979	G.B.	*Metal Spraying and New Surface Roughening Tool.* (Metal Industry, Vol. 62, No. 3, 4/6/43, p. 356.)
547	11006	U.S.A. ...	*Improvement in the Electrolytic Tinplating Process.* (Autom. Ind., Vol. 88, No. 6, 15/3/43, p. 206.)
548	11030	Germany ...	*Protective Lacquers for Zinc (from the German).* (Plastics, Vol. 7, No. 73, June, 1943, p. 258.)
549	11066	G.B.	*Black Nickel Deposition.* (E. Schore, Metal Industry, Vol. 62, No. 24, 11/6/43, pp. 378-380.)
550	11172	U.S.A. ...	*New Phosphating Treatment (Pre-Treatment with Disoduin Phosphate Containing Traces of Titanium).* (F. W. Van Antwerpen, Ind. and Eng. Chem. (News Ed.), Vol. 21, No. 9, 10/5/43, pp. 710-711.)
551	11255	U.S.A. ...	*Electroplating Metals (Data Sheet).* (Metal Progress, Vol. 43, No. 5, May, 1943, p. 741.)
552	11297	U.S.A. ...	*Recent Developments in Zinc Plating.* (M. B. Diggin, Metal Industry, Vol. 62, No. 26, 25/6/43, pp. 407-410.)
			Surface Finish (Polishing, etc.).
553	10722	U.S.A. ...	*The Foren Mill for Rolling Seamless Tubes.* (E. W. Wrage, Trans. A.S.M.E., Vol. 64, No. 8, Nov., 1942, pp. 745-751.)
554	10823	G.B.	*Surface Finish and the Function of Parts (Discussion).* (G. Schlesinger, Engineering, Vol. 155, No. 4,031, 28/5/43, p. 434.)
555	11038	G.B.	*Surface Finish and Function of Parts.* (G. Schlesinger, Engineer, Vol. 175, No. 4,561, 11/6/43, pp. 466-467.)
556	11044	G.B.	*Surface Finish and the Function of Parts.* (G. S. Schlesinger, Engineering, Vol. 155, No. 4,039, 11/6/43, pp. 464-465 and 478-480.)
557	11062	Germany ...	*Rolling Mills for Light Metals. (Translation from "Aluminium," Vol. 24, No. 5, 1942, pp. 161-165.)* (W. Kramer, Metal Industry, Vol. 62, No. 24, 11/6/43, pp. 370-372.)
558	11082	G.B.	*Surface Finish and the Function of Parts (Contd.).* (G. Schlesinger, Engineering, Vol. 155, No. 4,038, 4/6/43, pp. 454-455 and 458-460.)

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559	11168	G.B.	...	*Surface Finish and the Function of Parts.* (G. Schlesinger, Engineering, Vol. 155, No. 4,040, 18/6/43, pp. 498-499.)
560	11169	G.B.	...	*Electrolytic Polishing of Metals.* (S. Wernick, Chem. and Ind., Vol. 62, No. 26, 26/6/43, pp. 238-243.)
561	11256	U.S.A.	...	*A Versatile Metallographic Polishing Process.* (M. Ferguson, Metal Progress, Vol. 43, No. 5, May, 1943, pp. 743-744.)
562	11288	G.B.	...	*Polishing, Buffing and Burring.* (H. J. McAlees, Metal Industry, Vol. 63, No. 1, July 2, 1943, p. 9.)
563	11291	Germany	...	*Developments in Rolling Light Metals.* (*Aluminium, Vol. 24, pp. 204-205, 1942.*) (W. Kramer, Metal Industry, Vol. 62, No. 26, 25/6/42, pp. 402-403.)
564	11292	G.B.	...	*Developments in Grinding and Polishing.* (Metal Industry, Vol. 62, No. 26, 25/6/43, p. 403.)
565	11428	G.B.	...	*Surface Finish and the Function of Parts.* (G. Schlesinger, Preprint of Paper Read at the Inst. of Mech. Engs., 21/5/1943.)
				Heat Treatment.
566	10768	G.B.	...	*Electric Furnace Brazing Technique.* (Machinery, Vol. 62, No. 1,595, 6/5/43, pp. 488-491.)
567	10850	U.S.A.	...	*Effect of Cold Work and Heat Treatment on 24 St. Aluminium Alloy.* (B. Mitchell, J. Aeronautical Sci., Vol. 10, No. 3, March, 1943, pp. 86-90.)
568	10906	G.B.	...	*Iodine and Potassium Chloride from Metallic Dust from Blast Furnaces.* (P. Dicken and W. Middel, Eng. Digest, Vol. 4, No. 1, Jan., 1943, pp. 27-30.)
569	11015	U.S.A.	...	*Decarburized Zones.* (Metal Progress, Vol. 43, No. 4, April, 1943, pp. 570-571.)
570	11016	U.S.A.	...	*Converting Semi-Muffle Furnace to Full Muffle Type.* (Metal Progress, Vol. 43, No. 4, April, 1943, pp. 571-572.)
571	11020	U.S.A.	...	*Calibration of Platinum Thermocouple at Steel Melting Range.* (Metal Progress, Vol. 43, No. 4, April, 1943, pp. 598-600.)
572	11067	G.B.	...	*Heat Treatment of Non-Ferrous Alloys.* (Metal Industry, Vol. 62, No. 24, 11/6/43, p. 386.)
573	11096	G.B.	...	*Heat Treatment of the Wrought Aluminium Alloys. Pt. II—Equipment.* (W.L.A.D.A. Information Bulletin, No. 4.)
574	11250	U.S.A.	...	*Quench on Rising or Falling Heat?* (Metal Progress, Vol. 43, No. 5, May, 1943, pp. 715 and 752.)
575	11252	U.S.A.	...	*Heating of Heavy Forging Billets.* (Metal Progress, Vol. 43, No. 5, May, 1943, pp. 724-725.)
576	11276	G.B	....	*The Heat Treatment of Wrought Aluminium Alloys* (*Issued by the Wrought Light Alloys Development Association*). (Engineering, Vol. 155, No. 4,041, 25/6/43, p. 505.)

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			Corrosion.
577	10001	G.B.	*Sterilization of Cooling Water.* (Plastics, Vol. 7, No. 72, May, 1943, pp. 219-220.)
578	10687	G.B.	*New Methods for Examination of Corroded Metal.* (*F. H. Champion, Metallurgia, April,* 1943, *pp.* 217-220.) (Met. Vick. Tech. News Bull., No. 864, 30/4/43, p. 9.)
579	10729	U.S.A. ...	*Protecting Buried Metals Against Corrosion.* (S. Thayer, Trans. A.S.M.E., Vol. 64, No. 8, Nov., 1942, pp. 805-808.)
580	10730	U.S.A. ...	*Application of Cathodic Protection for Corrosion Protection (Submerged Structure).* (R. J. Sullivan, Trans. A.S.M.E., Vol. 64, No. 8, Nov., 1942, pp. 809-815.)
581	10824	G.B.	*Marine Corrosion.* (Engineering, Vol. 155, No. 4,031, 28/5/43, pp. 435-436.)
582	11416	G.B.	*Corrosion of Lead.* (Metal Industry, Vol. 62, No. 25, 18/6/42, p. 390.)
			Powder Metallurgy.
583	10702	G.B.	*Powder Metallurgy. (W. D. Jones, Trans. of the North-East Coast Inst. of Engrs. and Shipbuilders, March,* 1943, *pp.* 139-146.) (Met. Vick. Tech. News Bull., No. 859, 26/3/43, p. 8.)
584	10784	U.S.A. ...	*New Powder Metal Press.* (Metal Progress, Vol. 43, No. 3, March, 1943, p. 444.)
585	10907	G.B.	*Powder Metallurgy—Pt. I.* (Eng. Digest, Vol. 4, No. 1, Jan., 1943, p. 31.)
586	10982	G.B.	*Developments in Powder Metallurgy.* (J. Wulf, Metal Industry, Vol. 62, No. 23, 4/6/43, p. 362.)
587	11155	G.B.	*A New Injection Moulding Powder "Lustrac."* (British Plastics, Vol. 15, No. 169, June, 1943, p. 49.)
			Tools.
588	10765	G.B.	*Conservation of Tools by the Macrome Treatment.* (Autom. Eng., Vol. 33, No. 435, April, 1943, p. 169.)
589	10767	G.B.	*Negative Rake on Milling Cutters.* (Machinery, Vol. 62, No. 1,595, 6/5/43, p. 486.)
590	10770	G.B.	*Firth Brown Mitia Carbide Tools.* (Machinery, Vol. 62, No. 1,595, 6/5/43, pp. 497-498.)
591	10771	G.B.	*Carbide Inserted Tooth Milling Cutters Having Negative Rakes.* (Machinery, Vol. 62, No. 1,595, 6/5/43, pp. 501-502.)
592	11005	U.S.A. ...	*New Surface Hardening Tools.* (Autom. Ind., Vol. 88, No. 6, 15/3/43, p. 200.)
			Bonding.
593	10652	G.B.	*The Redux Process for Bonding.* (Aeroplane, Vol. 64, No. 1,669, 21/5/43, p. 602.)
594	11419	G.B.	*Bonding of Light Alloys.* (Metal Industry, Vol. 62, No. 25, 18/6/43, p. 394.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
			Moulding.
595	11535	G.B. ...	... *Uniform Casting for Injection Moulders.* (H. Senior, British Plastics, Vol. 15, No. 170, July, 1943, pp. 82-84.)
596	11595	Germany	... *Device for Regulating Moulding Temperature for Plastics (from Kunststoffe, Vol. 32, 1942, p. 947).* (Brandenburger, Plastics, Vol. 7, No. 74, July, 1943, p. 294.)
597	11600	G.B. ...	... *The Manufacture of Precision Mouldings.* (W. M. Halliday, Plastics, Vol. 7, No. 74, July, 1943, pp. 308-313.)
598	11610	U.S.A.	... *Heatronic Moulding of Plastics.* (Ind. and Eng. Chem. (News Ed.), Vol. 21, No. 10, 25/5/43, p. 763.)
599	11633	U.S.A.	... *Original Methods and Tools for Bending and Welding of Steel Tubing.* (Aviation, Vol. 42, No. 5, May, 1943, pp. 236-237 and 394.)
600	11702	U.S.A.	... *The Modern Method of Making Curved Plywood by Omnidirectional Pressure (Flexible Pressure Bag Moulding).* (T. D. Perry, A.S.M.E. Preprint, April 26-28, 1943.)
			C. Inspection.
			X-Ray and Similar Methods of Analysis.
601	10613	G.B. ...	... *Crack Detection by the Hyglo Process.* (Aircraft Production, Vol. 5, No. 6, June, 1943, p. 297.)
602	10675	G.B. ...	... *X-Ray Testing of Welds. (C. B. Clason, Welding Engineer, Aug., 1942, pp. 27-31.)* (Met. Vick. Tech. News Bull., No. 837, 23/10/42, p. 6.)
603	10685	G.B. ...	... *Crystallography for Routine Analysis. (C. H. Walker, M.V. Gaz., April, 1943, pp. 167-173.)* (Met. Vick. Tech. News Bull., No. 864, 30/4/43, p. 7.)
604	10686	G.B. ...	... *Annealed Aluminium as Revealed by X-Rays. (E. E. Spillet, J. Inst. Mat., April, 1943, pp. 149-175.)* (Met. Vick. Tech. News Bull., No. 864, 30/4/43, p. 8.)
605	10709	G.B. ...	... *Detecting Surface Flaws in Non-Magnetic Materials. (G. Ellis, Iron Age, 17/12/42, pp. 56-59.)* (Met. Vick. Tech. News Bull., No. 854, 19/2/43, p. 9.)
606	10790	G.B. ...	... *Inspection by Fluorescence (Hyglo Process).* (Aeroplane, Vol. 64, No. 1,666, 30/4/43, p. 495.)
607	10826	G.B. ...	... *Application of the Spectrograph to Steel Work Analysis.* (H. T. Shirley and E. Elliott, Engineering, Vol. 155, No. 4,031, 28/5/43, pp. 437-440.)
608	10903	Germany	... *Microscopic Method of Measuring Surface Roughness (from Die Werkzeugmaschine, Vol. 6, No. 9, May, 1942, pp. 267-268).* (Eng. Digest, Vol. 4, No. 1, Jan., 1943, p. 20-21.)
609	10978	G.B. ...	... *Electrographic Methols of Surface Analysis.* (M. S. Hunter and others, Metal Industry, Vol. 62, No. 23, 4/6/43.)

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610	10981	G.B.	*Modern Methods of Metallurgical Analysis—II.* (E. A. Liddiard, Metal Industry, Vol. 62, No. 23, 4/6/43, pp. 359-361.)
611	11052	U.S.A. ...	*Ultra-Violet Crack Detector.* (Sci. Am., Vol. 168, No. 5, May, 1943, p. 199.)
612	11063	G.B.	*Electrographic Methods of Surface Analysis (Contd.).* (M. S. Hunter and others, Metal Industry, Vol. 62, No. 24, 11/6/43, pp. 373-374.)
613	11083	G.B.	*Applications of the Spectrograph to Steelwork Analysis.* (Engineering, Vol. 155, No. 4,038, 4/6/43, pp. 456-457.)
			Mechanical Testing (General Methods).
614	10699	G.B.	*Rapid Non-Destructive Material Testing.* (*W. A. Knoop, Instruments, Jan.*, 1943, *pp.* 14-15.) (Met. Vick. Tech. News Bull., No. 859, 26/3/43, p. 7.)
615	10783	U.S.A. ...	*Hardness Testing of High Speed Steel at High Temperatures.* (E. C. Bishop and M. Cohen, Metal Progress, Vol. 43, No. 3, March, 1943, pp. 413-416, 442.)
616	10959	G.B.	*Accelerated Testing of Plastics for Weathering Resistance.* (L. K. Merrill and C. S. Myers, Engineering Inspection, Vol. 7, No. 2, April-June, p. 9-14.)
617	10966	G.B.	*Mercury Cracking Tests—Procedure and Control (Detecting Excessive Stresses in Copper Base Alloys).* (H. Rosenthal and A. L. Jamieson, Engineering Inspection, Vol. 7, No. 3, Autumn, 1942, pp. 9-13.)
618	11017	U.S.A. ...	*Rapid Identification Tests for Manganese and Sulphur in Steel.* (Metal Progress, Vol. 43, No. 4, April, 1943, p. 572.)
619	11170	U.S.A. ...	*Rohm and Haas Laboratory Equipment for Testing Transparent Plastics (Photographs).* (Ind. and Eng. Chem. (News Ed.), Vol. *21*, No. 9, 10/5/43, pp. 690-691.)
620	11235	G.B.	*Significance of Mechanical Test Properties of Metals (Contd.).* (H. O'Niell, Engineering, Vol. 156, No. 4,042, 2/7/43, pp. 18-20.)
621	11258	U.S.A. ...	*Spot Test for Manganese in Steel.* (Metal Progress, Vol. 43, No. 5, May, 1943, p. 746.)
622	11266	G.B.	*Tensile and Other Mechanical Test Properties of Metals. (Abstract of Paper Presented to Inst. of Mech. Engs)* (H. O'Neill, Engineer, Vol. 175, No. 4,563, 25/6/43, pp. 503-504.)
			INSTRUMENTS.
			Aircraft.
623	10724	U.S.A. ...	*Optimum Settings for Automatic Controllers.* (J. G. Ziegler and N. B. Nichols, Trans. A.S.M.E., Vol. 64, No. 8, Nov., 1942, pp. 759-768.)
624	10852	U.S.A. ...	*Graphical Analysis of Delay of Response in Air Speed Indicators.* (K. J. De Juhasz, J. Aeron. Sci., Vol. 10, No. 3, March, 1943, pp. 91-97.)

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625	11311	Germany	...	*Handy Tool for Recessing Ball-Bearing Seats on Aircraft Control Levers.* (Junkers, Flugsport, Vol. 35, No. 10, 16/6/43, p. 128.)
626	11374	G.B.	...	*A Radio Flight Test Recorder.* (H. W. Perry, Airc. Eng., Vol. 15, No. 172, June, 1943, pp. 174-177.)
627	11576	U.S.A.	...	*True Air Speed Indicator (Pat. No. 2,318,153).* (R. D. Gibson, U.S.A. Patent Specification.)
				Stress-Strain Gauges.
628	10703	G.B.	...	*A Recording Dilatometer. (L. R. Stanton, Iron and Coal Trades Review, 5/2/43, pp. 109-113.)* (Met. Vick. Tech. News Bull., No. 854, 19/2/43, p. 2.)
629	10706	G.B.	...	*A Magnetic Strain Gauge. (B. F. Langer, Westinghouse Engineer, Nov., 1942, pp. 117-122.)* (Met. Vick. Tech. News Bull., Vol. 854, 19/2/43, p. 6.)
630	10812	G.B.	...	*Simple Apparatus for Studying Deformation of Soft Materials Under Compression and Tension at Constant Stress.* (G. W. Scott Blair and B. Veinoglov, Journal of Scientific Instruments, Vol. 20, No. 4, April, 1943, p. 58.)
631	10833	U.S.A.	...	*The Porter-Lipp Strain Gauge (Simple Mechanical Type).* (Sci. Am., Vol. 168, No. 2, Feb., 1943, p. 87.)
632	10902	Germany	...	*Machine for Compressing the Surface of Screws to Improve Fatigue Strength (from Die Werkzeugmaschine, Vol. 6, No. 11, 1942, p. 331.)* (Eng. Digest, Vol. 4, No. 1, Jan., 1943, p. 19.)
633	11433	Germany	...	*Accelerometer for Determining Shock Load on Vehicle.* (P. Langer, Symposium of Papers on the Elements of Machine Design (Aachen), pp. 49-50.)
634	11251	U.S.A.	...	*New Pathways in Engineering (New Strain Gauges and Methods of Stress Analysis).* (A. V. de Forest, Metal Progress, Vol. 43, No. 5, May, 1943, pp. 719-723 and 750.)
635	11272	U.S.A.	...	*Sheet and Wire Gauge Reform—the "Preferred Number" System of the American Standards Association.* (Engineer, Vol. 175, No. 4,563, 25/6/43, pp. 504-507 and 511.)
636	11282	G.B.	...	*Recording Dilatometer for Metal Specimens.* (L. R. Stanton, Engineering, Vol. 155, No. 4,041, 25/6/43, pp. 518-519.)
				Electrical, Spectrometers, etc.
637	10672	G.B.	...	*The Londex Welder Timer. (Electrician, 16/10/42, p. 419.)* (Met. Vick. Tech. News Bull., No. 837, 23/10/42, p. 3.)
638	10813	G.B.	...	*The Electrical Screening of Sparking Apparatus for Use in Spectrographic Analysis.* (D. M. Smith and A. Walsh, Journal of Scientific Instruments, Vol. 20, No. 4, April, 1943, pp. 63-64.)
639	11053	U.S.A.	...	*The Betatron—New Powerful X-Ray Machine.* (A. R. Wildhagen, Sci. Am., Vol. 168, No. 5, May, 1943, pp. 207-209.)

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640	11157	U.S.A. ...	*An Improved Current Integrator.* (J. Morris Blair, Rev. of Sci. Insts., Vol. 14, No. 3, March, 1943, pp. 64-67.)
641	11563	U.S.A. ...	*Photo-Electric Glossmeter.* (Rev. of Sci. Instrum., Vol. 14, No. 4, April, 1943, p. 119.)
642	11577	U.S.A. ...	*An Experimental Mass Spectrometer.* (N. D. Coggeshal and E. B. Jordan, Rev. of Sci. Instrum., Vol. 14, No. 5, May, 1943, pp. 125-129.)
			Flow Meters.
643	11042	G.B.	*An Instrument to Measure Minute Changes in Specific Inductive Capacity of Cardboard and Hence to Determine its Water Content.* (S. D. Gardiner, J. Soc. Chem. and Ind., Vol. 62, No. 5, May, 1943, pp. 75-76.)
644	11159	U.S.A. ...	*Erratum: An Accurate High Sensitivity Apiezon Oil McLeod Gauge.* (J. Bannon, Rev. of Sci. Insts., Vol. 14, No. 3, March, 1943, p. 77.)
645	11239	U.S.A. ...	*An Improved Meter for the Measurement of Gas Flow Rates.* (W. G. Appleby and W. H. Avery, Ind. and Eng. Chem. (Anal. Ed.), Vol. 15, No. 5, 18/5/43, pp. 349-350.)
646	11240	U.S.A. ...	*Current Methods of Measuring Foam.* (S. Ross, Ind. and Eng. Chem. (Anal. Ed.), Vol. 15, No. 5, 18/5/43, pp. 329-334.)
			Miscellaneous (including Optical).
647	10785	U.S.A. ...	*Metal Washing Machine.* (Metal Progress, Vol. 43, No. 3, March, 1943, p. 444.)
648	10813	G.B.	*A Bath for Use in the Graduation and Testing of Thermometers.* (A. Grace and J. A. Hall, Journal of Scientific Instruments, Vol. 20, No. 4, April, 1943, pp. 60-63.)
649	10863	U.S.A. ...	*Split Second Timing by Special Tuning Forks.* (Sci. Am., Vol. 168, No. 4, April, 1943, p. 172.)
650	10870	U.S.A. ...	*A New Low Cost Air Clamp.* (Sci. Amer., Vol. 168, No. 4, April, 1943, p. 184.)
651	10900	G.B.	*Miniature Instruments.* (J. M. Whittenton, Eng. Digest, Vol. 4, No. 1, Jan., 1943, pp. 11-12.)
652	10901	G.B.	*Inkless Recording.* (P. E. Twiss, Eng. Digest, Vol. 4, No. 1, Jan., 1943, pp. 12-16.)
653	11061	U.S.A. ...	*Armour Plate Width Measured from a Distance by Mirrors.* (Sci. Am., Vol. 168, No. 5, May, 1943, p. 224.)
654	11294	G.B.	*Calibrating a Microscope.* (Metal Industry, Vol. 62, No. 26, 25/6/43, p. 403.)
			PRODUCTION.
			Control and Organisation.
655	10635	Germany ...	*German Production Methods.* (Flight, Vol. 43, No. 1,794, 13/5/43, p. 500.)
656	10766	G.B.	*The Willow Run Bomber Plant Production Method, etc.* (Machinery, Vol. 62, No. 1,595, 6/5/43, pp. 477-484.)

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657	10787	G.B.	*Production Publicity.* (Aeroplane, Vol. 64, No. 1,666, 30/4/43, p. 494.)
658	10961	G.B.	*Quality, Production and Progress.* (A. N. Appleby, Engineering Inspection, Vol. 7, No. 2, April-June, 1942, pp. 22-24.)
659	10962	G.B.	*The Statistical Control of Quality in Production Engineering.* (R. Royan and H. Rissik, Engineering Inspection, Vol. 7, No. 1, Jan.-March, 1942, pp. 4-19.)
660	10963	G.B.	*Standards for Precision Engineering.* (G. O. Watson, Engineering Inspection, Vol. 7, No. 1, Jan.-March, 1942, pp. 20-24.)
661	10989	U.S.A. ...	*Statistical Data on American War Production.* (Autom. Ind., Vol. 88, No. 6, 15/3/43, pp. 53-97.)
662	10996	U.S.A. ...	*Alphabetical List of Government Agencies.* (Autom. Ind., Vol. 88, No. 6, 15/3/43, pp. 124-125.)
663	11236	G.B.	*New Kodak School of Industrial Radiography.* (Elect. Eng., Vol. 15, No. 185, July, 1942, pp. 58-59.)
664	11281	G.B.	*Wage Systems and Incentives.* (T. E. A. K. Jackson, Engineering, Vol. 155, No. 4,041, 25/6/42, pp. 516-517.)
665	11303	G.B.	*Maximum Works Production.* (Engineer, Vol. 176, No. 4,564, 2/7/43, pp. 13-14.)
666	11310	Germany ...	*Changes in the German Patent Laws.* (Flugsport, Vol. 35, No. 10, 16/6/43, pp. 131-132.)
667	11406	U.S.A. ...	*New Magnesium Production Plant.* (F. J. van Antwerpen, Ind. and Eng. Chem., Vol. 212, No. 8, 25/4/43, pp. 545-547.)
668	11441	U.S.A. ...	*Modification Centres for Effecting Changes in Aircraft Design as Dictated by Battle Front Experience (for Consolidated Aircraft).* (S. Hotchkiss, Aviation, Vol. 42, No. 4, April, 1943, pp. 134-136 and 329-333.)
669	11479	G.B.	*Control of Short Brothers by the Government.* (Inter. Avia., No. 867, 1/5/43, pp. 19-20.)
			Research and Training.
670	10653	U.S.A. ...	*T. P. Wright's Address to the Institute of Aeronautical Sciences.* (Flight, Vol. 43, No. 1,794, 13/5/43, p. 499.)
671	10956	Italy	*Italian National Research Council.* (Inter. Avia., No. 861, 17/3/43, p. 14.)
672	10972	G.B.	*Research in South Africa (Rubber, Road Research, etc.).* (Engineer, Vol. 175, No. 4,560, 4/6/43, p. 447.)
673	10974	China ...	*Engineering Developments in China.* (Engineer, Vol. 175, No. 4,560, 4/6/43, pp. 449-451.)
674	11046	G.B.	*Education and Training for Engineers (Contd.).* (Engineering, Vol. 155, No. 4,039, 11/6/43, pp. 476-477.)
675	11084	U.S.A. ...	*Organisation of American Scientists for the War.* (K. T. Compton, Nature, Vol. 151, No. 3,839, 29/5/43, pp. 601-606.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
676	11215	U.S.S.R. ...	*Biogeochemical Research in the U.S.S.R.* (A. P. Vinodradov, Nature, Vol. 151, No. 3,841, 12/6/43, pp. 659-661.)
677	11270	G.B.	*Science and the State.* (Engineer, Vol. 175, No. 4,563, 25/6/43, p. 507.)
678	11275	G.B.	*Education and Training for Engineers—II.* (*Report of the Inst. Elect. Engs.*) (Engineering, Vol. 155, No. 4,041, 25/6/43, pp. 504-505.)
679	11298	G.B.	*Engineers and the British Empire—I.* (M. Smith, Engineer, Vol. 176, No. 4,564, 2/7/43, pp. 2-3.)
680	11305	G.B.	*National Research.* (Sir Stafford Cripps, Engineer, Vol. 176, No. 4,564, 2/7/43, p. 17.)
681	11496	U.S.S.R. ...	*Russian Research and Development Awards.* (Inter. Avia., No. 868, 10/5/43, pp. 15-16.)
			Aircraft Production Methods.
682	10608	G.B.	*Small Scale Track Assembly.* (Aircraft Production, Vol. 5, No. 56, June, 1943, pp. 259-261.)
683	10609	G.B.	*Production of the De Havilland Mosquito.* (W. E. Goff, Aircraft Production, Vol. 5, No. 56, June, 1943, pp. 262-273.)
684	10610	G.B.	*Metal Aircraft Units Produced with Woodworking Machinery.* (Aircraft Production, Vol. 5, No. 56, June, 1943, pp. 277-279.)
685	10612	G.B.	*Producing Bomber Castings—Pt. I.* (Aircraft Production, Vol. 5, No. 56, June, 1943, pp. 292-296.)
686	10845	U.S.A. ...	*The Manufacturing Processes of Plastic Planes.* (Pegasus, Vol. 1, No. 2, Feb., 1943, pp. 1-3 and 16.)
687	11316	Germany ...	*Method of Joining Plastic Aircraft Parts by Means of Heat and a Special Cement.* (*Pat. series No.* 5, 732,922.) (Nobel, Flugsport, Vol. 35, No. 10, 16/6/43, pp. 29-30.)
688	11350	Germany ...	*Conveyor System for the Mass Production of Bulky Aircraft Parts.* (*Pat. series No.* 4, 732,868.) (Henschel, Flugsport, Vol. 35, No. 9, 19/5/43, p. 25.)
689	11388	U.S.A. ...	*Wheel Maintenance at American Airlines.* (R. Miller, Aviation, Vol. 42, No. 3, March, 1943, pp. 245-247 and 380.)
			Methods (General).
690	10683	G.B.	*Adapting Automatic Electric Welding to Routine Production.* (*J. M. Keir, Weld. J., March*, 1943, *pp.* 173-179.) (Met. Vick. Tech. News Bull., No. 864, 30/4/43, p. 3.)
691	10698	G.B.	*Flash Welding—I.* (*L. A. Ferney, Welding, March*, 1943, *pp.* 154-160.) (Met. Vick. Tech. News Bull., No. 859, 26/3/43, p. 4.)
692	10700	G.B.	*Making Alloy Steel by Arc Welding.* (*J. A. Newman, Steel*, 11/1/43, *pp.* 74-76, 78 *and* 80.) (Met. Vick. Tech. News Bull., No. 859, 26/3/43, p. 7.)

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693	10704	G.B.	...	*Resistance Welds with Electronic Control.* (*T. R. Lawson, Westinghouse Engineer, Nov.*, 1942, *pp.* 109-113.) (Met. Vick. Tech. News Bull., No. 854, 19/2/43, p. 4.)
694	10705	G.B.	...	*Electrolytic Tin-Plating Lines and Reflowing Methods.* (*J. R. Erbe, Westinghouse Engineer, Nov.*, 1942, *pp.* 129-130.) (Met. Vick. Tech. News Bull., No. 854, 19/2/43, p. 5.)
695	10775	U.S.A.	...	*Network of Shops for Heat Treating Small Armour.* (L. Strouffer, Metal Progress, Vol. 43, No. 3, March, 1943, pp. 390-391.)
696	10832	U.S.A.	...	*Rapid Metal Plating in Situ (without Dismantling).* (Sci. Am., Vol. 168, No. 2, Feb., 1943, p. 86.)
697	10867	U.S.A.	...	*Templates Rapidly Produced with New Transfer Film (Pliofilm).* (Sci. Am., Vol. 168, No. 4, April, 1943, pp. 177-178.)
698	10975	G.B.	...	*Recent Advance in the Electro-Metallurgical Industry.* (Engineer, Vol. 175, No. 4,560, 4/6/43, p. 451.)
699	10981	G.B.	...	*Tube Forming by the Spun End Process.* (Metal Industry, Vol. 62, No. 23, 4/6/43, p. 358.)
700	11010	U.S.A.	...	*Ships Welded on a Production Line.* (G. F. Wolfe, Metal Progress, Vol. 43, No. 4, April, 1943, pp. 550-554.)
701	11032	Germany	...	*Production Methods for Magnets (Metal Powders Bonded with Synthetic Resin) (from the German).* (Plastics, Vol. 7, No. 73, June, 1943, p. 259.)
702	11035	G.B.	...	*Co-operation Between User and Moulder in the Production of Precision Mouldings.* (W. M. Halliday, Plastics, Vol. 7, No. 73, June, 1943, pp. 262-267.)
703	11271	G.B.	...	*Marking Methods and War Production.* (Engineer, Vol. 175, No. 4,563, 25/6/43, pp. 512-514.)
704	11274	G.B.	...	*Statistical Methods in Industry.* (*Published by Iron and Steel Industrial Research Council, Brit. Iron and Steel Fed.*) (Engineering, Vol. 155, No. 4,041, 25/6/43, p. 503.)
705	11313	Germany	...	*Device for the Cold Bending of Alloy Tubes up to 20 mm. Diameter (no Filling Required).* (Junkers, Flugsport, Vol. 35, No. 10, 16/6/43, p. 130.)
706	11317	Germany	...	*Method of Preparing Hollow Plastic Sections by Means of an Internal Flexible Air Bag.* (*Pat. series No.* 5, 732,923.) (Focke-Wulf, Flugsport, Vol. 35, No. 10, 16/6/43, p. 30.)
707	11336	Germany	...	*Mobile Unit for Periodic Cleaning of the Lubricating System of Machine Tools.* (Flugsport, Vol. 35, No. 9, 19/5/43, pp. 111-112.)
				Inspection, Routine Analysis.
708	10958	G.B.	...	*X-Ray Technique in the Industrial Laboratory.* (H. P. Rooksby, Engineering Inspection, Vol. 7, No. 2, April-June, 1942, pp. 4-8.)
709	10967	G.B.	...	*Lighting for Inspection.* (R. O. Ackerley, Engineering Inspection, Vol. 7, No. 3, Autumn, 1942, pp. 16-22.)

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710	11165	G.B.	*Inspecting Apparatus for Small Parts.* (Engineering, Vol. 155, No. 4,040, 18/6/43, pp. 487 and 490.)
711	11178	G.B.	*Crystallography for Routine Analysis.* (C. H. Walker, Engineer, Vol. 175, No. 4,562, 18/6/43, pp. 492-494.)
			Equipment, Lay-Out.
712	10905	Germany ...	*The Most Efficient Layout of Electric Arc Furnace Steel Works. (From Stahl und Eisen, Vol. 61, No. 29, July, 1941, pp. 685-694.)* (H. Müller, Eng. Digest, Vol. 4, No. 1, Jan., 1943, pp. 27-30.)
713	11079	Germany ...	*Economising Electrical Energy in German Industry.* (Engineering, Vol. 155, No. 4,038, 4/6/43, p. 450.)
714	11184	U.S.A. ...	*New Production Equipment.* (Autom. Ind., Vol. 88, No. 7, 1/4/43, pp. 38 and 60-68.)
			Scrap Salvage.
715	11013	U.S.A. ...	*Practical Programmes for Reclamation of Metal Scrap (Symposium of Articles).* (J. L. Cannon and others, Metal Progress, Vol. 43, No. 4, April, 1943, pp. 561-569.)
			Welfare of Workers.
716	10857	U.S.A. ...	*Anti-Sabotage Lighting.* (J. A. Summers, Sci. Am., Vol. 168, No. 4, April, 1943.)
717	11003	U.S.A. ...	*Accident Prevention in Aircraft Manufacture.* (W. S. Rhodes, Autom. Ind., Vol. 88, No. 6, 15/3/43, pp. 151-154 and 352-354.)
718	11054	U.S.A. ...	*Industrial Safety (Research and Development).* (Sci. Am., Vol. 168, No. 5, May, 1943, pp. 216-218.)
719	11057	U.S.A. ...	*Feed Control Improves Safety in Magnesium Plant.* (Sci. Am., Vol. 168, No. 5, May, 1943, p. 222.)
720	11212	G.B.	*Hours of Work, Health and Efficiency.* (Nature, Vol. 151, No. 3,841, 12/6/43, pp. 651-652.)
721	11233	G.B.	*Lighting as a Factor in Production.* (Engineering, Vol. 156, No. 4,042, 2/7/43, p. 12.)
722	11235	G.B.	*Safety with X-Rays.* (H. G. Long, Elect. Eng., Gt. Brit., Vol. 15, No. 185, July, 1942, pp. 52-54 and 84.)
			TRANSPORT.
			Tanks, Jeeps, etc.
723	10757	G.B.	*The G.P. War Truck (Jeep).* (Autom. Eng., Vol. 33, No. 435, April, 1943, pp. 131-136.)
724	10772	U.S.A. ...	*Some Notes on Armour Plate for Ships and Tanks.* (Metal Progress, Vol. 43, No. 3, March, 1943, pp. 382-387.)
725	10773	U.S.A. ...	*Tank Armour.* (G. M. Barnes, Metal Progress, Vol. 43, No. 3, March, 1943, p. 389.)
726	10774	U.S.A. ...	*Tank Design.* (Metal Progress, Vol. 43, No. 3, March, 1943, pp. 389, 432, 436.)

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727	10776	U.S.A.	...	*Welded Hull for Combat Tank.* (E. Brookes, Metal Progress, Vol. 43, No. 3, March, 1943, pp. 392, 395, 430.)
728	10856	U.S.A.	...	*Army Motor Vehicles for Various Purposes (Instruction Maintenance, etc.).* (Sci. Am., Vol. 168, No. 4, April, 1943, p. 153.)
729	10866	U.S.A.	...	*New Flame Detector for Use in Tanks.* (Sci. Am., Vol. 168, No. 4, April, 1943, p. 174.)
730	11000	U.S.A.	...	*Ford Building Amphibian Jeep.* (Autom. Ind., Vol. 88, No. 6, 15/3/43, p. 138.)
731	11175	G.B. ...	...	*Welded Armoured Fighting Vehicles.* (Engineer, Vol. 175, No. 4,562, 18/6/43, pp. 485-486.)
732	11186	Germany	...	*German Mark IV Tank.* (Autom. Ind., Vol. 88, No. 7, 1/4/43, p. 39.)
733	10762	G.B. ...	...	*Battery Electric Vehicle.* (Autom. Eng., Vol. 33, No. 435, April, 1943, pp. 155-159.)
734	11192	Germany	...	*Oil Waggons for Carrying Oil Supply for Machine Tools.* (Junkers, Flugsport, Vol. 35, No. 8, 21/4/43, p. 95.)
735	11284	G.B. ...	...	*Counter Pressure Brake Testing of Locomotives.* (E. Cattanes, Engineering, Vol. 155, No. 4,041, 25/6/43, p. 514.)

WIRELESS AND ELECTRICITY.

Radio and Television.

736	10987	G.B. ...	...	*Wireless Engineer, Abstracts and References.* (June, 1943.)
737	11068	U.S.A.	...	*Radio Progress during* 1942. (Procs., I.R.E., Vol. 31, No. 4, April, 1943, pp. 127-131.)
738	11069	U.S.A.	...	*Frequency Modulation Distortion in Loud Speakers.* (G. L. Beers and H. Belar, Procs., I.R.E., Vol. 31, No. 4, April, 1943, pp. 132-138.)
739	11071	U.S.A.	...	*Radio Frequency Operated High Voltage Supplies for Cathode Ray Tubes.* (O. H. Schade, Procs., I.R.E., Vol. 31, No. 4, April, 1943, pp. 158-163.)
740	11141	U.S.A.	...	*Condenser Scoop Design.* (E. F. Hewins and J. R. Reilly, Soc. of Naval Architects and Marine Engs. (Transactions), Vol. 48, 1940, pp. 277-304.)
741	11174	U.S.A.	...	*Optimum Current Distribution on Vertical Antennas.* (L. La Paz and G. A. Miller, Procs. Inst. Rad. Engs., Vol. 31, No. 5, May, 1943, pp. 214-232.)
742	11210	Germany	...	*Installation of Radio Altimeters in the Wing Structure. (Pat series No.* 3, 731,987.) (Siemens, Flugsport, Vol. 35, No. 8, 21/4/43, p. 20.)
743	11214	G.B. ...	...	*Radio Receiver Design (Book Review).* (Nature, Vol. 151, No. 3,841, 12/6/43, p. 657.)
744	11237	G.B. ...	...	*Factors Determining the Choice of Carrier Frequency for an Improved Television System.* (B. J. Edwards, Engineering, Vol. 15, No. 185, July, 1942, pp. 60-64.)
745	11238	G.B. ...	...	*Measuring Instruments for Radio.* (E. H. W. Banner, Elect. Eng., Vol. 15, No. 185, July, 1942, pp. 76-79.)

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			Electricity (General).
746	10673	G.B.	*The Electrical Equipment of the New Deep Shelters.* (*Electrical Review*, 16/10/42, pp. 481-484.) (Met. Vick. Tech. News Bull., No. 837, 23/10/42, p. 4.)
747	10818	G.B.	*An Automatic Low Frequency Analyser* (*Electrobiology*). (W. G. Walter, Elect. Eng., Vol. 15, No. 184, June, 1942, pp. 9-13.)
748	10984	G.B.	*Discussion on the Electric Spark in Air.* (J. Inst. Elect. Engs., Vol. 90, No. 29, Pt. I, May, 1943, pp. 197-199 and 200-202.)
749	11072	U.S.A. ...	*Network Theory, Filters and Equalizers* (*Pt. I*). (F. E. Terman, Procs., I.R.E., Vol. 31, No. 4, April, 1943, pp. 164-175.)
750	11087	G.B.	*A New Electrical Frequency Divider.* (Nature, Vol. 151, No. 3,839, 29/5/43, pp. 621-622.)
751	11173	Germany ...	*Improvement of the Insulating Properties of P.V. Chlorides with the Addition of Silicates.* (I.G. Farben, Frankfurt/Main, D.R.P. 704,301, 28/3/41. Zeit. für Fernmeldetechnik, Vol. 23, Heft 1, 16/1/42, p. 12.)
752	11218	G.B.	*The High Pressure Gas-Filled Cable.* (Nature, Vol. 151, No. 3,841, 12/6/43, p. 669.)
753	11280	G.B.	*High Rupturing Capacity Air-Break-Circuit Breakers.* (Engineering, Vol. 155, No. 4,041, 25/6/43, p. 513.)
754	11312	Germany ...	*Wire Rope Connections* (*Electrical Cutting Gives Pointed Ends which are Secured by Passing Through a Tube and Twisting*). (Messerschmitt, Flugsport, Vol. 35, No. 10, 16/6/43, p. 129.)
755	11578	U.S.A. ...	*An Electrical Transducer* (*Vibration Recorder Circuit for Use with Capacity Pick-up Devices.* (E. V. Potter, Rev. of Sci. Instrum., Vol. 14, No. 5, May, 1943, pp. 130-135.)
			Electronics.
756	10825	G.B.	*Electron Diffraction.* (G. P. Thompson, Engineering, Vol. 155, No. 4,031, 28/5/43, p. 436.)
757	11073	U.S.A. ...	*Electron Method for Soldering Crystal Units in Radio Equipment.* (Procs., I.R.E., Vol. 31, No. 4, April, 1943, p. 40.)
758	11075	G.B.	*Electron Diffraction* (*Contd.*). (G. P. Thompson, Vol. 155, No. 4,038, 4/6/43, pp. 444-445.)
759	11213	G.B.	*High Frequency Thermionic Tubes* (*Book Review*). (Nature, Vol. 151, No. 3,841, 12/6/43, p. 655.)
			Magnetism, etc.
760	10817	G.B.	*Reflexion of Electromagnetic Waves from a Parabolic Ionised Layer.* (O. E. H. Rydbeck, Phil. Mag., Vol. 34, No. 232, May, 1943, pp. 342-348.)
761	10862	U.S.A. ...	*Variations in the Earth's Magnetic Field Through the Geologic Ages.* (A. G. McNish, Sci. Am., Vol. 168, No. 4, April, 1943, pp. 166-167.)
762	11221	G.B.	*Recent Advances in the Theory of the Fundamental Particles of Physics.* (H. J. Bhabha, Nature, Vol. 151, No. 3,840, 5/6/43, pp. 628-629.)

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HEAT AND LIGHT (HEAT TRANSFER AND COLOUR VISION).			
763	10718	U.S.A. ...	*Radiation Configuration Factors Using Light in Furnace Models (Mutual Visibility of Radiating Elements).* (F. E. England and H. O. Croft, Trans. A.S.M.E., Vol. 64, No. 7, Oct., 1942, pp. 691-702.)
764	10723	U.S.A. ...	*The Analysis of a Continuous Process by a Discontinuous Step Method (as Applied to Heat Exchangers).* (J. A. Hrones, Trans. A.S.M.E., Vol. 64, No. 8, Nov., 1942, pp. 753-758.)
765	10726	U.S.A. ...	*A Review of Heat Transfer Coefficients and Friction Factors for Tubular Heat Exchangers.* (B. E. Short, Trans. A.S.M.E., Vol. 64, No. 8, Nov., 1942, pp. 779-785.)
766	10727	U.S.A. ...	*Condensation of Saturated Freon-12 Vapour on a Bank of Horizontal Tubes.* (F. L. Young and W. J. Wohlenberg, Trans. A.S.M.E., Vol. 64, No. 8, Nov., 1942, pp. 787-794.)
767	10983	G.B. ...	... *The British Climate and the Space-Heating Engineer.* (R. Grierson, J. Inst. Elect. Engs., Vol. 90, No. 29, Pt. I, May, 1943, pp. 187-196.)
768	11086	G.B. ...	... *Conical Refraction.* (S. Melmore, Nature, Vol. 151, No. 3,839, 29/5/43, pp. 620-621.)
769	11176	G.B. ...	... *Reflection as a Factor in Heating.* (M. Fielden, Engineer, Vol. 175, No. 4,562, 18/6/43, pp. 486-487.)
770	11219	G.B. ...	... *The Nature of Entropy.* (M. W. Thring, Nature, Vol. 151, No. 3,841, 12/6/43, p. 672.)
771	11222	G.B. ...	... *Visual Purple and Dark Adaptation.* (R. Granit, Nature, Vol. 151, No. 3,840, 5/6/43, pp. 631-632.)
772	11223	G.B. ...	... *Light and Vision.* (E. N. Willmer, Nature, Vol. 151, No. 3,840, 5/6/43, pp. 632-635.)
773	11227	G.B. ...	... *The Warming of Walls.* (A. F. Dufton, Phil. Mag., Vol. 34, No. 233, June, 1943, pp. 376-377.)
774	11228	G.B. ...	... *A Note on Entropy and Irreversible Processes.* (W. Ehrenberg, Phil. Mag., Vol. 34, No. 233, June, 1943, pp. 396-409.)
775	11230	G.B. ...	... *Additional Note on the Trichromatic Theory of Colour Vision.* (W. Peddie, Phil. Mag., Vol. 34, No. 233, June, 1943, pp. 426-430.)
PHOTOGRAPHY (AERIAL CAMERAS).			
776	10611	G.B. ...	... *Aerial Cameras: Design and Operation of Type F.8.* (J. H. Oates, Aircraft Production, Vol. 5, No. 56, June, 1943, pp. 280-289.)
METEOROLOGY (SOLAR ACTIVITY, LIGHTNING EFFECTS, ETC.).			
777	10684	G.B. ...	... *Effect of Lightning Currents of Long Duration on Variable Resistance Lightning Arrestors.* (S. Szpor, A.S.E. Bull., 31/1/43, pp. 15-21.) (Met. Vick. Tech. News Bull., No. 864, 30/4/43, p. 4.)
778	10816	G.B. ...	... *The Absorption of Infra-Red Radiation by Water Vapour and Carbon Dioxide.* (M. McCaig, Phil. Mag., Vol. 34, No. 232, May, 1943, pp. 321-342.)

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779	10830	U.S.A. ...	*Fundamental Celestial Navigation.* (E. B. Collins, Sci. Am., Vol. 168, No. 2, Feb., 1943, pp. 66-67.)
780	10861	U.S.A. ...	*Astral Navigation for the Aerial Navigators.* (Sci. Am., Vol. 168, No. 4, April, 1943, pp. 164-165.)
781	10865	U.S.A. ...	*New Lightning Shield.* (Sci. Am., Vol. 168, No. 4, April, 1943, p. 174.)
782	11070	U.S.A. ...	*Effects of Solar Activity on the Ionosphere and Radio Communications.* (H. W. Wells, Procs., I.R.E., Vol. 31, No. 4, April, 1943, pp. 147-157.)
783	11225	G.B.	*Protection of Structures Against Lightning.* (Nature, Vol. 151, No. 3,840, 5/6/43, pp. 638-639.)

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(Parachute Baling Out, High Altitude Effects, etc.).

784	10625	G.B.	*Functioning of the Human and Mechanical System Under Simulated Flight Conditions.* (Flight, Vol. 43, No. 1,795, 20/5/43, pp. 528-531.)
785	11116	Germany ...	*The Effect of Extremely Rapid Reduction in Atmospheric Pressure on the Mammalian Organism (Abstract Available).* (R. Kilches, Luftfahrtmedizin, Vol. 7, No. 1, 1942, pp. 35-45.)
786	11117	Germany ...	*The Limits of Circulatory Adjustment in Acute Anoxæmia Experiment (Abstract Available).* (H. Loeschcke, Luftfahrtmedizin, Vol. 7, No. 1, 1942, pp. 1-8.)
787	11118	Germany ...	*Compensated Anaglyphs to Koch's Visual Capacity Testing Apparatus.* (Feulgen, Luftfahrtmedizin, Vol. 7, No. 1, 1942, p. 46.)
788	11119	Germany ...	*The "Reduction Time" as an Index for Oxygen Supply of the Tissues.* (Werz and Reiter, Luftfahrtmedizin, Vol. 7, No. 1, 1942, p. 47.)
789	11120	Germany ...	*The Behaviour of Muscle Tone in Acute Anoxæmia (Abstract Available).* (Schnell, Luftfahrtmedizin, Vol. 7, No. 1, 1942, p. 68.)
790	11121	Germany ...	*Survival Time After Very Sudden Drop in Pressure at Extremely High Altitudes.* (Loutz, Luftfahrtmedizin, Vol. 7, No. 1, 1942, pp. 84-97.)
791	11122	Germany ...	*Intestinal Movements Under the Influence of Anoxæmia (Abstract Available).* (G. A. Weltz and R. v. Werg, Luftfahrtmedizin, Vol. 7, No. 1, 1942, pp. 98-117.)
792	11123	Germany ...	*Suggestions for Defining the Disturbance Thresholds and Phases Through Oxygen Deficiency.* (Diringshofen, Luftfahrtmedizin, Vol. 6, No. 1-4, 23/4/42, pp. 149-151.)
793	11124	Germany ...	*The Action of Aerodynamic Forces on Circulation of Personnel Sitting in Aircraft.* (Diringshofen, Luftfahrtmedizin, Vol. 6, No. 1-4, 23/4/42, pp. 152-165.)
794	11125	Germany ...	*The Action of Doses of Sugar on the Resistance to Anoxæmia and Acapnia at Great Altitudes.* (Polonowski, Luftfahrtmedizin, Vol. 6, No. 1-4, 23/4/42, p. 270.)

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795	11126	Germany ...	*Air Transport of Casualties.* (Schmidt, Luftfahrtmedizin, Vol. 6, No. 1-4, 23/4/42, p. 279.)
796	11127	Germany ...	*Structural Changes Caused by General Oxygen Lack, Especially in Altitude Diseases.* (Buchner, Luftfahrtmedizin, Vol. 6, No. 1-4, 23/4/42, p. 281.)
797	11128	Germany ...	*Acidosis of the Heart Muscle in Oxygen Deficiency.* (Gollinitzer and Meier, Luftfahrtmedizin, Vol. 6, No. 1-4, 23/4/42, p. 296.)
798	11129	Germany ...	*Principles for Investigation of the Energetics of the Heart.* (Kramer, Luftfahrtmedizin, Vol. 6, No. 1-4, 23/4/42, p. 303.)
799	11130	Germany ...	*The Electrical Phenomena Peripheral Anoxæmia.* (Schaefer, Luftfahrtmedizin, Vol. 6, No. 1-4, 23/4/42, p. 314.)
800	11131	Germany ...	*Cerebral Circulation in Altitude Collapse.* (Scneider, Luftfahrtmedizin, Vol. 6, No. 1-4, 23/4/42, p. 323.)
801	11132	Germany ...	*The Safety Time Limits in Baling Out (Considerations on Parachute Descents from Great Heights).* (Diringshofen, Luftfahrtmedizin, Vol. 6, No. 1-4, 23/4/42, p. 327.)
802	11133	Germany ...	*Blood Investigations in Pilots of a Pursuit Squadron.* (Bucker, Luftfahrtmedizin, Vol. 6, No. 1-4, 23/4/42, p. 327.)
803	11134	Germany ...	*Regulation of Blood Pressure Under the Action of Gravity in Changing Direction and its Disturbances.* (S. Dretrich, Luftfahrtmedizin, Vol. 6, No. 1-4, 23/4/42, p. 327.)
804	11137	Germany ...	*The Scientific Basis for Height Tolerance Tests by Means of Breathing Definite Gas Mixtures.* (Benzinger and others, Luftfahrtmedizin, Vol. 6, No. 1-4, 23/4/42, p. 234.)
805	11138	Germany ..	*The Present Position of Musso's Acapnia Theory.* (Luftfahrtmedizin, Vol. 6, No. 1-4, 23/4/42, p. 257.)
806	11139	Germany ...	*The S.T. Depression of the Electro-Cardiogram as a Symptom of Anærobic Cardiac Metabolism.* (Wendt, Luftfahrtmedizin, Vol. 6, No. 1-4, 23/4/42, p. 264.)

MATHEMATICS AND ASTRO-PHYSICS.

807	10720	U.S.A. ...	*Characteristics of Centrally Supported Journal Bearings (Mathematical Solution of Reynolds Equation).* (E. O. Waters, Trans. A.S.M.E., Vol. 64, No. 7, Oct., 1942, pp. 711-719.)
808	10815	G.B.	*The Evaluation of the Complex Roots of Algebraic Equation.* (A. F. Cornock and S. M. Hughes, Phil. Mag., Vol. 34, No. 232, May, 1943, pp. 314-320.)
809	10839	Switzerland ...	*The Damping of Control Systems Obeying Equations of any Order.* (A. Luthi, Escher Wyss, No. 15-16, 1942-1943, pp. 90-95.)
810	10840	Switzerland ...	*Simple Method for Calculating Critical Pressure Ratios for a Series of Stages (with Application to Stodola's Steam Cone Diagram).* (H. Bollier, Escher Wyss, No. 15-16, 1942-1943, pp. 96-100.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
811	11216	G.B. ...	... *Origin of Cosmic Rays.* (R. A. Millikan, Vol. 151, No. 3,841, 12/6/43, pp. 663-664.)
812	11567	U.S.A.	... *General Equation for the Analysis of Elliptic Rings.* (D. O. Domasch, J. Aeron. Sci., Vol. 10, No. 4, April, 1943, pp. 119-126.)
813	11573	Germany	... *Applications of the Principle of Parallelisms (Differential Geometry) to the Theory of Thin Shells.* (F. Reutter, Z.A.M.M., Vol. 22, No. 2, April, 1942, pp. 87-98.)

October, 1943

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NOTE.—As far as possible, the country of origin quoted in the items refers to the original source.

Ballistic and Technical Problems of Aerial Combat. (T. W. Schmidt, Luftwissen, Vol. 10, No. 1, Jan., 1943, pp. 10-17.) (115/1 Germany.)

With a fixed gun, it is necessary for the fighter to approach a moving target along the so-called curve of pursuit.

This path, referred to a target travelling in a straight line, takes the simple form

$$r=\frac{\{\, r_{90}\,(\tan\theta/2)^n\,\}}{\sin\theta}$$

where r = distance between two aircraft at any instant.
θ = angle between radius vector and target course.
n = speed of fighter/speed of target.
r_{90} = distance when $\theta=90°$.

The following table gives r/r_{90} for $n=1.5$ at various values of θ:—

$\theta°$	0	10	20	30	40	45	50	60	70	80	90
r/r_{90}	0	.149	.216	.277	.342	.377	.416	.507	.623	.781	1.000

It is interesting to note that $d\theta/dt=v_t \sin\theta/r$ gives the apparent angular velocity of approach of the fighter relative to the target and $dr/dt=v_F-v_t\cos\theta$ is the relative velocity of approach along the radius vector (v_F and v_t are fighter and target speeds respectively). On account of the finite speed of the bullet, the aim must be in front of the target and the actual curve of approach will differ appreciably from the simple theoretical case.

The aim is correct if trajectories of target and bullet intersect at the same instant.

Assuming the target to move in a straight line at constant speed, its subsequent positions will be a series of circles in the flight plane. If the gun is considered at rest in the same plane the trajectories of the bullet fired in any direction will also intersect this plane in a series of circles.

A possible hit can therefore be scored at all points of intersection of two sets of circles with the same parameter.

It is interesting to note that if the original distance between gun and target exceeds a certain fraction of the maximum range, it may be impossible to score a hit if the target is moving away from the gun. Moreover, this field of escape may include a considerable angle on either side of the original gun target line.

The following table gives the maximum effective firing distance of a gun with a muzzle velocity of 620 m./sec. and a maximum range of 3,300 m. At distances greater than these values, it will be just possible for the target to escape when flying away from the gun at the speed given in the table.

Max distance (m.)	...	3,300	1,900	1,150	650	350
Target speed (km./h.)	...	0	200	400	600	800

The rapid decrease of effective distance with target speed will be noted.

When taking into account the motion of the gun, it is convenient to consider two limiting cases.

(1) Gun is Moving in Direction of Fire.

Relative to the ground, the muzzle speed is increased by the vectorial component of the gun velocity and the resultant bullet velocity is at a smaller angle of elevation than for the stationary gun.

The first effect tends to increase the range, but the second diminishes it.

The net effect is, however, generally an increase. Thus for the gun considered and sighted at 400 (elevation $\sim 22°$) motion of the gun at 150 m./sec. increases the range to 470 m.

Relatively to the gun, however, the bullet range is shortened to 360 m., the difference being the distance moved by the gun in the time for the trajectory to intersect the horizontal plane.

With diminution in density (increase in altitude) both the ground and relative ranges increase.

It is interesting to note that at an altitude of 4,000 m. the relative trajectory becomes identical with that of the gun at rest, the old range of 400 m. being restored.

This so-called " equivalent altitude " is of importance since the normal ballistic tables will apply under these conditions.

(2) Lateral Fire.

When the gun is firing at right angles to its path, the trajectory of the bullet relatively to the gun has a double curvature in space. When viewed in a lateral direction the bullet appears to lag behind the gun by an angle which depends on the speed of the gun, muzzle velocity of bullet and ballistic characteristics of the latter. Whilst earlier investigators were of the opinion that such lateral fire would constitute serious ballistic difficulties (Cazaux) it is now known that stable trajectories can be ensured. The problem cannot, however, be considered by any means as completely solved.

Regions of Infinite Acceleration and Flow Realms in a Compressible Fluid. (M. G. Scherberg, J. Aeron. Sci., Vol. 10, No. 7, July, 1943, pp. 223-226.) (115/2 U.S.A.)

It appears probable that the shock wave is a physical necessity for making possible a compressible flow which would otherwise require infinite acceleration, just as circulation round an aerofoil overcomes the need for infinite acceleration at the trailing edge.

It is therefore of interest to investigate under what conditions regions of infinite acceleration would theoretically arise in the potential isentropic flow of a compressible fluid. Some aspects of this problem have already been considered by von Kármán in a previous issue of this Journal (Vol. 8, No. 9, July, 1941, pp. 337-355). The present paper deals with the same subject in a more general manner.

Using polar co-ordinates, the two dimensional potential flow is given by

$$\left(\frac{rv}{a^2}\right)(\dot{v}-rw^2)-\frac{\partial v}{\partial r}r\dot{=}v+\left(\frac{r^2w}{a^2}\right)(r\alpha+2wv)-r\left(\frac{\partial w}{\partial\theta}\right)=O \quad . \quad . \quad (1)$$

where r = radius vector.
θ = angular position of above.
v = radial velocity
w = angular velocity
α = angular acceleration } at point $r_1\theta$.
P = pressure
a = velocity of sound

In the above

$$(\dot{v}-rw^2)=-\left(\frac{1}{\rho}\right)\left(\frac{\partial p}{\partial r}\right)=\text{radial component of acceleration.}$$

$$(2vw+r\dot{d})=-\left(\frac{1}{\rho}\right)\left(\frac{\partial\rho}{r\partial\theta}\right)=\text{transverse component of acceleration.}$$

$$((rw)^2+v^2)^{1/2}=V=\text{resultant velocity at } r_1\theta.$$

Choosing a reference system for which the radial component of acceleration is zero, the (transverse) acceleration is given by

$$A=\left[\frac{V^2}{rw}\right]\left[\frac{\partial v/\partial r}{\{(rw/a)^2-1\}}\right]$$

If $\partial v/\partial r$ is finite, $A\to\infty$ as $rw\to a$, *i.e.*, under these conditions, infinite acceleration occurs if the component of the velocity in the direction of the acceleration vector reaches the value of the local velocity of sound.

If the V and A vectors are permanently at right angles, it is clear that there is no such component and hence A cannot become infinite (circular flow).

If V and A are in the same direction (radial flow), $A\to\infty$ when $V\to a$.

If, however, $\partial v/\partial r=0$, A may be finite although $rw=a$ (flow round a corner, with exception of corner itself).

Similarly $rw\mp a$ cannot give rise to infinite acceleration unless $\partial v/\partial r\to\infty$.

For finite value of $\partial v/\partial r$, the appearance of infinite acceleration as we pass from sonic to supersonic V can thus be delayed or altogether avoided if we ensure a sufficiently large angle between the V and A vectors. This generally applies to the forward portion of an aerofoil (fairly large curvature) and V may thus reach sonic values over this region without $A\to\infty$. On the other hand, a sharp change in curvature of the aerofoil immediately aft of this point may cause the V component in the direction of A to reach sonic value and unless $\partial v/\partial t\to O$ in this region, $A\to\infty$. The general acceleration formula may also be written as

$$A=\left(\frac{V}{rw}\right)^2\left(\frac{\partial v}{\partial r}\right)\left\{\frac{[1-(V/V_m)^2]}{[(rw/V_c)^2+(v/V_m)^2-1]}\right\}$$

where V_m = max. speed attainable (expansion into a vacuum)
$=(2/(1-\gamma))^{1/2}a_0$ (a_0 = velocity of sound with fluid at rest)
$V_c=a=$ local velocity of sound.

The velocity field is thus divided into two realms by the ellipse

$$(rw/V_c)^2+(v/V_m)^2=1$$

with semi-axes V_c and V_m respectively.

When the hodograph of a stream line comes near or crosses this hodograph ellipse, large acceleration may be expected unless $\delta v/\delta r \to 0$.

Tail Buffeting. (G. Abdrashitov, C.A.H.I. Report No. 395, Moscow, 1939.) (R.T.P. Translation No. T.M. 1,041.) (115/3 U.S.S.R.)

In its wider sense, buffeting denotes forced vibrations of any part of the aircraft structures due to the aerodynamic action of the wake. On account of the dangerous vibrations which may be induced in the tail surface when subjected to the wake from the wings, it is usual to restrict the term to this special class of phenomenon.

In spite of a considerable amount of theoretical and experimental work, it cannot be said that the phenomena in the wake are fully understood. There is no doubt that the velocity in the wake undergoes periodic variations associated with the periodic shedding of the Kármán vortices by the body originating the wake. It appears that the frequency f of the disturbance bears a definite relationship to the stream velocity V and the dimension b of the body responsible for the wake (measured at right angles to V, *i.e.*,

$$f = \frac{(K+V)}{b} \text{ vibrations/sec.}$$

where K = so-called Strouhal constant

$= \sim .20$ for plates or aerofoils.

It should, however, be pointed out that the experimental verification of this law has so far been limited to $Re \sim 200{,}000$ and further investigations at higher Reynolds numbers are urgently wanted. According to the author's experiments, $K = \sim .10$ at $Re = 10^6$.

Although the centre of the wake conforms to the so-called downward angle, the downward deflection increasing with the lift, there is a rapid diminution in this deflection as soon as the stalling angle is reached, and at larger angles of attack the wake is practically in the direction of the incident air stream, the most intense disturbances being in line with the wing nose. The width of the wake is usually defined by means of total pressure surveys. There is evidence that as far as buffeting is concerned, the influence of the wake extends beyond the limits thus defined. At small angles of incidence the wake is very narrow, but it broadens out rapidly as the stall is approached.

Very little is as yet known about the amplitude of the velocity disturbances in the wake and the rate of decay with distance. The theoretical treatment is very difficult on account of the unsteady nature of the flow and the effect of viscosity.

In order to simplify the problem, the author assumes that the wake causes a periodic change in the incidence α of the tail, *i.e.*,

$$d\alpha = A \sin w\tau$$

where A = maximum change of α.

w = wake frequency.

The extra lift per unit length at the section x of the tail thus becomes

$$dp = \left(\frac{\delta C_y}{\delta \alpha}\right) A \sin w\tau \rho V^2 t\,(x)$$

where $t\,(x)$ = chord of tail and V = velocity of air.

[It will be noticed that the lift coefficient C_y is referred to ρV^2.]

Assuming the tail surface to correspond to a cantilever beam, the problem then reduces itself to that of forced vibrations. Only aerodynamic damping will be considered. If

y = deflection at any section.

$\dot{y}/V$ = change of incidence due to motion.

$(\delta C_y/\delta \alpha)\,\rho V t\,(x)\,\dot{y}$ = damping force.

The equation of motion thus becomes

$$\left(\frac{\partial^2}{\partial x^2}\right)\left(EI\frac{\partial^2 y}{\partial x^2}\right)+m\,(x)\,\ddot{y}+\text{damping force}=\text{excitation force},$$

where $m\,(x)$ = mass per unit length at section x.

Assuming a uniform beam of constant section

$$\begin{aligned} m\,(x) &= m = \\ EI &= \text{constant}. \\ t\,(x) &= t = \text{constant}, \end{aligned}$$

and the equation reduces to

$$EIy^{IV}+m\ddot{y}+a_1 V\dot{y}=k_1 V^2 \sin w\tau$$

where a_1 and k_1 are constants.

$a_1 V/2m$ represents the damping coefficient ($\sim \partial C_y/\partial\alpha \,.\, V$) of the natural vibrations of the system.

It will be noted that the damping is positive, provided the tail operates below the stall.

Limiting ourselves to this condition, the forced vibrations only need be considered and it is easily shown that the maximum deflection under resonance is given by

$$Y \text{ max.} = \text{constant} \times f\,(x) \times \left\{\frac{V}{\sqrt{(EI/m)}}\right\}$$

where $f\,(x)$ determines the mode of vibration of the beam (usually the fundamental). The aerodynamic properties of the tail thus do not enter into the expression and only the elastic properties appear. For a given mode and elastic characteristics, the maximum deflection thus varies directly as V, and the frequency of the vibrations under resonance is the same as the natural frequency of the system = frequency w of external disturbance.

Similar expressions can be obtained for the case of pure torsional vibrations. In this case, however, the natural frequency itself depends on V and diminishes with increasing V. Morecver, the deflection at resonance does not only depend on the elastic properties of the tail, as was the case in pure bending, but the aerodynamic characteristics also affect the result.

The case becomes very much more complicated if both flexural and torsional oscillations exist together. In practice this must nearly always be the case due to relative displacement of the elastic and inertia axes.

The solution of the two systems of partial differential equations are expressed by the author in the form

$$\begin{aligned} y &= f\,(x)\,\zeta\,(\tau) \\ \theta &= \phi\,(x)\,\psi\,(\tau) \end{aligned}$$

$$\text{where } \begin{aligned} \zeta &= A\cos w\tau + B\sin w\tau \\ \psi &= C\cos w\tau + D\sin w\tau \end{aligned}$$

Provided $f\,(x)$ and $\phi\,(x)$ are known, the constants A, B and C can be determined, although the expressions are very cumbersome.

The author has solved the problem in a special case, assuming that $f\,(x)$ and $\phi\,(x)$ (*i.e.*, the form of the tail vibration) in the flow is the same as in a vacuum.

The results show that in the presence of both forms of vibration the forced bending oscillations increase almost directly as V and reach a well pronounced maximum at resonance (in this particular case at $V = 110$ m./sec.). As regards bending, therefore, the tail conforms closely to the predictions of the simplified theory for one degree of freedom only (bending). The forced torsional oscillations, on the other hand, only become marked when the resonance speed of the bending vibration is approached. This appears to indicate that tail failure due to buffeting may be mainly due to bending stresses, which was the opinion arrived at in the famous Meopham accident (Ju. 13).

The author next carried out simple experiments on the buffeting of a tail surface of 585 mm. semi-span tapering from 262 mm. (root chord) to 131 mm. at the tip. This model was supported elastically on a single spar in such a way that the entire load is taken on the spar.

The model could be placed at various distances behind the main wing of 600 mm. chord originating the wake, and tests were carried out both with an isolated wing and in the presence of a fuselage, simulated in this case by a flat board.

The position of the tail surface was in a plane tangential to the top surface of the wing and parallel to the incident flow, experience having shown that vibrations were most pronounced in this position (tail in line with vortices shed by top surface of wing).

The experiments showed that buffeting only occurred if there was separation of flow at the main wing. In the absence of a fuselage this means that the wing incidence must be above the critical ($\sim$ 20°). Vibrations, when they occur, are strictly periodical with a Strouhal number of about .1, provided the tail does not stall. If the tail setting is near the stalling value, the wake disturbance causes the tail flow to alternate between normal and breakaway flow and the response is no longer a periodic vibration.

In the presence of a fuselage, a wake begins to form at the wing root before the stall of the wing as a whole, provided V is sufficiently high. The resulting vibration at the tail is however not important till the critical angle of the main wing is reached. Even in this case, however, the amplitudes are throughout much less than in the case of a free wing, *i.e.*, the fuselage exerts a powerful damping influence.

The frequency of the induced vibrations is however not affected by the presence of the fuselage.

In conformity with the formulæ developed, increasing the stiffness of the wing raises the air velocity for resonance and reduces the amplitude of the maximum deflections.

The author finally investigates the magnitude of the aerodynamic load on the tail due to buffeting. The maximum value of this load is given by

$$\left(\frac{A\partial C_y}{\partial \alpha}\right)\rho V^2 S$$

where A = amplitude of α variation and S = area of tail surface.

Similarly the maximum aerodynamic steady load is given by

$$C_y \text{ max. } \rho V^2 S.$$

By referring the air load due to buffeting to this standard load, a non-dimensional buffeting load coefficient is obtained, defined as

$$C = \frac{(A\partial C_y/\partial \alpha)}{C_y \text{ max.}}$$

Knowing $\partial C_y/\partial \alpha$ and the periodicity of the wake, the value of A (the amplitude of the incidence variation due to buffeting) can be obtained from the amplitude of the forced vibrations (recorded photographically) making use of the differential equation of motion. The experimental results show that just before the stall of the main wing ($\alpha = 20°$), C increases in the absence of a fuselage from about .20 to .60 as tail resonance is approached, but it is in excess of 1.0 for large angles of incidence ($\alpha = 30°$). In the latter case there is practically no speed effect. In the presence of a fuselage, the C values are practically halved.

Summing up, the author draws the following conclusions:—

(1) Buffeting is a resonance effect, the periodicity w of the wake agreeing with the natural frequency p of the tail under bending.

(2) The periodicity of the wake can be estimated from the air speed and the dimensions of the main wing, the Strouhal number being of the order of .12.

At 300 m.p.h. and a wing chord of 10 feet, $\alpha = 20°$, the wake frequency is of the order of 30 vibrations per second. To prevent resonance, the wing frequency must be appreciably above this figure.

(3) The magnitude of the wing vibration at resonance increases steadily with V. The additional load due to buffeting may amount to 50 or even 100 per cent. of the normal aerodynamic load on the tail.

(4) The wake only contains sufficient energy to induce marked vibrations if the wing originating it is stalled (separation of flow).

(5) Although the wake under these conditions has considerable width, the most dangerous tail position is in line with the top surface of the wing.

The remedies to obviate buffeting are thus clearly indicated:—

(1) Separation of flow at the main wing must be avoided. This applies especially to the root fillets.

(2) The tail must be placed well above the top surface of the main wing.

(3) The natural frequency of the tail should be above that of the wake.

In conclusion, it must be emphasised that the actual character of the tail vibration is very complex and can only be very roughly represented by the simplified system assumed by the author. It is felt, however, that the treatment adopted will give to the practical designer an inkling of the factors involved in producing critical conditions.

Problems of Aircraft Development. (A. Lippisch, Luftwissen, Vol. 10, No. 4, April, 1943, pp. 113-118.) (115/4 Germany.)

Lilienthal was the first who demonstrated experimentally that a slightly cambered surface is a more efficient lift producing agent than a flat plate (1871). Such a surface will produce lift even at zero incidence, thus showing that the momentum theory of lift, till then generally accepted, was untenable.

His subsequent treatise (published in 1890) contained the germ of the modern circulation theory but was completely ignored in Germany.

Although Lilienthal carried out a large number of flights with his glider lasting as long as one minute and covering 300-400 m., his machine suffered from structural weakness due to his attempted copy of bird wing shape. Moreover his method of control (shifting weight of body) was unsatisfactory. It was left to the Americans, Chanute and Wright, to devise the strutted and wire braced biplane construction which by freeing itself from the bird analogy provided a sound engineering solution which held the field for a long time.

The Wrights were also the first to solve the problem of control without altering the position of the c.g. of the aircraft. From the aerodynamic point of view, subsequent development has been rather slow, and until fairly recently improvements in performance were almost entirely due to the larger and more reliable power plants becoming available. The return to glider flying in Germany after World War I concentrated attention on the question of aerodynamic efficiency and this together with the rapid advance in aerodynamic theory paved the way to the modern high speed aircraft in which the drag is reduced to a minimum.

Whilst one source of drag, i.e. that due to boundary layer friction is now fairly well understood, the other source due to interference between the propeller, wing and fuselage is far from being under control.

The author is of the opinion that the "all wing" type of aircraft, by suppressing body/wing interference, presents a promising line of development in this connection, especially if fitted with rear propellers.

In such a machine, all the control surfaces will be carried on the wing and are thus clear of slip stream and downwash effects.

Certain parts of modern high speed aircraft are already subjected to supersonic flow conditions, although the aircraft as a whole is still moving well under sonic speed.

Such compressibility effects will become more pronounced as the aircraft speed increases. They lead to an appreciable increase in the drag and reduce the factor of safety of the structure. Although the latter difficulty might be overcome by the introduction of higher quality materials in the danger zones, there is no doubt that any marked further increase in flying speed over present day maxima will call for radical changes in design of the aircraft. The author concludes with the hope that German science will find a satisfactory solution for this pressing problem.

Problem of Routine Propeller Balancing. (J. T. Farrah, J. Aeron. Sci., Vol. 10, No. 7, July, 1943, pp. 209-212.) (115/5 U.S.A.)

Unbalance exists to a varying degree in all engine propeller combinations but does not build up to large amplitudes in every case. The propeller gear ratio has a large effect since it determines the frequency of phase coincidence between engine and propeller. Thus a 3:2 gear ratio results in a phase agreement every three revolutions, whilst a 16/11 ratio is only in phase every 16 revolutions and thus preferable.

In addition to gear ratio, the noticeable effects of unbalance depend markedly on the power plant suspension, resonance characteristic of the aircraft, distribution of slip stream, etc., and may thus vary considerably for different types of aircraft. Thus the author instances the case of a propeller tip being sheared off accidentally during take-off of a scheduled air liner and the unbalance not being noticed until the engine was throttled back for the next landing.

The absence of noticeable effects during flight is thus no guarantee of balance and much more sensitive tests must be applied before freedom from avoidable stresses can be assumed.

The author describes an electrical device for this purpose which essentially consists of an electromagnetic vibration pick-up which is clamped to the aircraft structure, the induced current being fed to the stationary coils of a watt meter, whilst the phase of a separate current flowing through the moving coil is adjustable. By observing the phase shift required for max. watt meter reading when adding a known unbalance to the original propeller, both the direction and amount of any original unbalance can be obtained and corrected by suitable balance weights.

The usual procedure is to balance the propeller on the original aircraft, with the engine running on the ground. Thus in addition to any inherent propeller unbalance both the effects of engine unbalance and slip stream are allowed for. It is not surprising that a propeller balanced in this manner may show considerable static and dynamic unbalance when tested by itself in a balancing machine.

Nevertheless propeller tests with the engines on the test bench should prove very valuable, since they may obviate the need of a subsequent balance on the aircraft which is always a tedious and expensive process.

Every effort should be made to render suitable equipment for this purpose generally available.

In conclusion, the author stresses the need for manufacturers building into their propellers ready means for correcting unbalance that may develop during use.

Aerodynamic Considerations of Rotors in Hovering and Vertical Climb Conditions. (C. H. Kármán, J. Aeron. Sci., Vol. 10, No. 7, July, 1943, pp. 201-208.) (115/6 U.S.A.)

The blade element theory of propellers depends on a knowledge of the magnitude and direction of the air stream relative to the moving blade for all distances along the radius.

In addition to the forward and circumferential speeds of the element, the value of the so-called interference flow must be known.

In the ordinary vortex theory, this interference flow is calculated from the induced velocity due to the helical vortex shed by the propeller, under the assumption that the spacing of the vortex is sufficiently close to represent a uniform solenoid (∞ number of blades).

The results obtained in this manner are in satisfactory agreement with practice for a finite number of blades provided the pitch and thrust coefficients are relatively small.

An accurate theoretical solution for the general case of propellers of high pitch/diameter ratios with a finite number of blades has not yet been obtained.

Goldstein has, however, obtained an exact solution for a finite number of blades, provided a definite circulation distribution exists on the blades such that the flow in the wake at a large distance behind the propeller is identical with the potential flow associated with the uniform axial motion of equidistant helicoidal surfaces of finite radius R. According to the ordinary vortex theory, the inflow angle β is given by the relation

$$\sigma C_L = (4 \tan \beta \,.\, \sin \phi) \quad . \quad . \quad . \quad . \quad . \quad (1)$$

where σ = solidity = $Bb/2r$ (B = number of blades, b = blade width).

$\phi = \theta - \alpha = \beta + \phi_0$.

θ = section blade angle.

α = angle of attack for infinite aspect ratio.

α_0 = geometric angle of advance.

The Goldstein expression is identical with (1), except that the right hand side is multiplied by a factor k which depends on the number of blades B, ϕ and $x\,(=r/R)$.

The author gives these k factors in a series of graphs from which the representative values are given in the following table:—

		Number of Blades B.											
		2			3			4			6		
ϕ	x=.3	.75	.95	.3	.75	.95	.3	.75	.95	.3	.75	.95	
0	1	1	1	1	1	1	1	1	1	1	1	1	
10	1	.89	.45	1	.96	.55	1	.98	.63	1	1	.77	
20	.96	.67	.27	.99	.80	.37	1	.87	.44	1	.94	.55	
30	.94	.50	.20	.97	.66	.27	.98	.75	.33	.98	.85	.45	
40	.93	.41	.16	.97	.56	.22	.98	.65	.27	1.0	.78	.37	
60	.92	.37	.13	1.02	.48	.19	1.02	.58	.23	1.02	.70	.32	

For each blade number, k is given for three representative stations $x = r/R$. As $B \to \infty$, $k \to 1$ for all stations, *i.e.*, the ordinary and Goldstein vortex theories give identical results.

For a finite number of blades, as already stated, the Goldstein solution is only correct for a particular circulation distribution leading to a wake of constant pitch and diameter travelling at a constant axial speed (independent of r).

This corresponds to the condition of minimum energy loss. According to the author, however, the Goldstein correction factor even when applied to the general case of circulation distribution presents a marked improvement over the original vortex theory as applied to helicopter problems.

For precise analysis, the following procedure is adopted:—

ϕ_0 and θ are known.

(1) Assume β—this gives ϕ, since $\beta + \phi_0 = \phi$. Hence C_L can be calculated for the given rotor element, using equation (1).

(2) This C_L must agree with the tabulated lift coefficients for infinite aspect ratio for the given section at the angle of attack $\alpha = \theta - \phi$.

These two values of C_L must agree. If not, repeat calculation with a different value of β.

(3) Knowing C_L, C_D follows (experimental data) and hence the power and thrust coefficients can be calculated.

$$\left.\begin{aligned}\frac{dC_T}{dx}&=\left(\frac{\pi^3}{4}\right)x^3\sigma C_L\left(\frac{\cos^2\beta}{\cos^2\phi_0}\right)\cos\phi\left\{1-\tan\phi\left(\frac{C_D}{C_L}\right)\right\}\\ \frac{dC_P}{dx}&=\left(\frac{\pi^4}{4}\right)x^3\sigma C_L\left(\frac{\cos^2\beta}{\cos^2\phi_0}\right)\sin\phi\left\{1+\cot\phi\left(\frac{C_D}{C_L}\right)\right\}\end{aligned}\right\} \quad . \quad . \quad (2)$$

These are plotted on an x basis and on integration give C_T and C_P for the complete propeller.

SIMPLIFIED SYSTEM OF CALCULATIONS.

When the plan and pitch distribution are known, it is possible to express C_P in terms of the local value at $x=.75\,R$, *i.e.*,

$$C_P=9.22\frac{\sin 2\beta\sin^2\phi}{\cos^2\phi_0}\left\{1+\left(\frac{C_D}{C_L}\right)\cot\phi\right\}k$$

In this case the integrating factor has been chosen as .6 corresponding to optimum loading conditions.

The calculation has been carried out by the author for a three-bladed rotor for β ranging from 2 to 14° and C_D/C_L from 0 to .06 with ϕ_0 as parameter (0–6°), the results being presented in tabular form.

Now if

P = h.p. input to rotor.
ρ = air density.
n = rev. per second.
D = diameter of rotor.

$$C_P=P/\rho n^3D^5$$

If C_P is known, the above tables can be used to calculate β, since

$$\phi_0=\tan^{-1}V/2\pi rn.$$

(A correction factor T for β is given by the author, if the number of blades differ from 3.)

Substituting for the solidity factor in equation (1) we obtain C_L and hence C_D (provided coefficients of section are available).

From equation (2) the ratio C_T/C_P readily follows and the thrust of the rotor is finally given by

$$T=C_T/C_P\times\text{horse-power}/60\ nD\times 33{,}000.$$

Now if $V_s/2$ = slipstream velocity at rotor

$$T=\rho\pi R^2V_s^2/2.$$

Also KE of slipstream (input per second) $=\rho\,(\pi R^2/4)\,V_s^3$.

Assuming that the whole of the h.p. input to the rotor reappears as slipstream energy

$$T_{\text{ideal}}=10.4\ D^{2/3}\ (\text{h.p.})^{2/3}\times(\rho/\rho_0)^{1/3}$$

It is thus possible to estimate the so-called figure of merit of the rotor in hovering flight, T/T_{ideal}.

In conclusion the author points out that the optimum $(b/D)\ C_L$ distribution for hovering flight as given by the Goldstein theory calls for a marked taper in this factor as we proceed towards the tip. The load distribution also shifts slightly towards the tip with an increasing number of blades. General aerodynamic considerations show, however, that such an optimum blade design conflicts with the most desirable feature for horizontal top speed and rotors designed for autorotation.

Nevertheless, the optimum design criteria are most desirable in planning the necessary compromise solutions.

Further experimental data on the performance of helicopter rotors in forward flight are urgently wanted.

Designed Strengthened Materials. (R. S. Smith and H. Gray, J. Aeron. Sc., Vol. 10, No. 7, July, 1943, pp. 213-217.) (115/7 U.S.A.)

Ordinary corrugated sheet has the following disadvantages:—

(1) The buckling strength is only increased for loads parallel to the corrugations. The strength perpendicular to the corrugation is reduced.
(2) The weight per unit projected area is increased.
(3) The workability of the corrugated sheet is limited.

The authors describe a new process of transferring wavy line patterns to one or both surfaces of the sheet metal by passing it through special rollers.

The object of this so-called " design strengthening " is to achieve a re-distribution of metal in flat sheets so as to improve both the strength/weight and rigidity/weight ratios. The degree of improvement depends on the design of the pattern impressed and its depth.

The pattern can be applied to strengthen the sheet in one direction without weakening it in a perpendicular direction or alternatively the pattern can be such that there is an improvement in two directions at right angles. Displacement of metal can be increased to improve rigidity or decreased to meet other requirements of the finished part. The radii of the lobes in the pattern may be increased to improve transverse fatigue stress values or reduced to secure maximum flexural rigidity. Plain areas can be incorporated for riveting. Since the sheet remains substantially flat after treatment (the distance between successive waves varying between 1/32 and $\frac{1}{2}$ in., whilst the depth of the waves is of the order of 0.2 in.), the weight per unit projected area is the same as that of the original material and the workability as regards stamping, drawing, forming or welding remains unchanged.

The author gives data on the strength characteristic of several types of steel and aluminium sheet, both in the original flat state and after " design strengthening."

The following table shows the improvement obtained:—

Material.	Tensile.	Buckling (cylinder test).	Flexural rigidity (beam test).
Stainless steel (full hard).	Prop. Limit increased 25 per cent. Yield decreased 5 per cent., ultimate increased 8 per cent.	Ultimate buckling strength unaffected. Yield strength increased by 26 per cent. Prop. limit increased by 35 per cent.	E.I. increased by over 80 per cent.
Alclad.	Yield unaffected ultimate increased by 15 per cent.	No results given.	E.I. increased about 100 per cent.
Carbon steel (cold rolled).	Ultimate up by 30 per cent. Yield increased by over 250 per cent.	Buckling strength increased 70 per cent.	E.I. increased about 15 per cent.
Cr. Mo steel (cold rolled).	Ultimate up by 20 per cent.	Buckling strength increased 44 per cent.	No results given.

Buckling of Al. Alloy Columns and Plates. (H. L. Langhaar, J. Aeron. Sciences, Vol. 10, No. 7, July, 1943, pp. 218-222.) (115/8 U.S.A.)

The Euler buckling equation for columns can be put into the form:—

$$\sigma_{crit} = E_e \times \left\{ \frac{1}{(L/\pi\rho \times 1/\sqrt{C})^2} \right\}$$

where E_e = effective Young's modulus.
L = length of column.
ρ = radius of gyration of section.
C = end fixity constant.
= 1 (both ends free).
= 4 (both ends fixed).

Similarly for a plate

$$\sigma_{crit} = E_e \times \left\{ \frac{1}{(b/t \times 1/\sqrt{K})} \right\}$$

where b = width of plate.
t = thickness.
K = constant, depending on aspect ratio, end fixity, Poisson ratio and type of loading.

In the elastic range, $E_e = E$ = constant and plotting σ_{crit} against either $L/(\pi\rho\sqrt{c})$ or $b/(t\sqrt{K})$ will produce the well known Euler hyperbola. In the non-elastic range, E_e is variable and less than E with the result that σ_{crit} falls below the Euler hyperbola. The author has carried out a series of experiments on the buckling strength of 24S Al. alloy in the form of columns of various cross-sections as well as plates.

He concludes that

(1) E_e is the same for columns or plates, provided the material has the same yield point.

σ_{crit} is thus a constant for the same values of either

$$\frac{L}{(\pi\rho\sqrt{c})}(\text{columns or} \frac{b}{(t\sqrt{K})}(\text{plates}).$$

(2) In the inelastic range (*i.e.*, departure from Euler curve) σ_{crit} is for the materials examined is approximately given by the linear equation

$$\sigma_{crit} = F_y [1.2 - .506 X\sqrt{F_y/E}]$$

where

F_y = yield stress of material.
E = Young's modulus.
$X = L/(\pi\rho\sqrt{c})$ or $b/(t\sqrt{K})$ depending on whether columns or plates are tested.

(3) the separation between the elastic and inelastic ranges occurs at the point $X = 1.58\sqrt{(E/F_y)}$.

In conclusion, the author shows how the charts prepared by him can be used for the analysis of a hot type stringer section undergoing buckling.

For such a combination, the ultimate load P per panel is given by

$$P = \sigma_s A_s + 2t(W_1 + W_2)\sigma_m$$

where

A_s = cross-sectional area of stringer.
σ_s = ultimate stringer stress (either local or column failure σ_{st} or σ_{sc} whichever is the smaller).
σ_m = max. plate stress (either plate stress σ_{ps} corresponding to σ_s or plate stress σ_{pr} to cause buckling between the rivets, whichever is the smaller).
W_1 = effective width corresponding to stringer span b_1.
W_2 = effective width corresponding to clear plate span b_2.
t = thickness of plate.
t_s = thickness of stringer.
b_s = width of stringer side wall.

σ_{sf} corresponds to $b_s/t_s\sqrt{K}$ abscissa in the chart, with $K = 2.3$ (experimental value).

σ_{sc} corresponds to $L/\pi\rho\sqrt{C}$ abscissa in the chart, with C as a linear function of L/ρ ranging from $C=3$ at $L/\rho=0$ to $C=3.6$ at $L/\rho=80$.

If plate and stringer are of the same material, $\sigma_{ps}=\sigma_s$. If not, σ_{ps} must be determined by comparative stress-strain curves.

σ_{pr} producing buckling between the rivets corresponds to the failure of a column length $p-d$ (when $p=$rivet pitch and $d=$diameter of rivet) and $\rho=t/\sqrt{12}$.

Assuming $C=4$, σ_{pr} corresponds to the abscissa $\sqrt{3}\,(p-d)/\pi t$ on the chart.

Again σ_m is the smaller of the two values σ_{ps} and σ_{pr}.

EFFECTIVE WIDTH.

On the assumption that the stress distribution between consecutive rivet rows is a cosine wave with maximum σ_m on the rivet line and minimum value σ_{cr} midway between the rivet lines.

$$W_1=(\tfrac{1}{4})\,b_1\ (1+\sigma_{cr1}/\sigma_m)$$
$$W_2=(\tfrac{1}{4})\,b_2\,(1+\sigma_{cr2}/\sigma_m)$$

σ_{cr1} and σ_{cr2} correspond to the abscissæ $b_1/t\sqrt{K}$ and $b_2/t\sqrt{K}$ respectively on the chart, with $\sqrt{K}=2.2$ (mean exp. results).

The author states that the method described gives P within ± 10 per cent. provided the buckling stress of the plate is at least 15 per cent. of σ_s. For weaker plates, P is overestimated, mainly because the formulæ for the effective width W_1 and W_2 no longer hold.

Piezo Electric Pressure Recorders of High Natural Frequency—Vibration Characteristics and Protection Against Interference by Inertia Forces. (W. Gohlke, U.D.I. Research Paper No. 407, 1941.) (R.T.P. Translation No. T.H. 1,040.) (115/9 Germany.)

A piezo electric pressure recorder comprises the following parts:—

(1) Pick-up proper.
(2) Amplifier.
(3) Recorder.
(4) Connecting cables.
(5) Power supply.

In an ordinary indicator the pressure is measured directly by the compression of a spring. In the piezo electric instrument this spring is replaced by a quartz crystal, the compression of which is measured indirectly by the electric charge generated.

Items 2-5 can be designed so as to reproduce satisfactorily electric currents of a frequency up to 10,000 cycles/sec., although most of the commercial equipment available at the moment suffers from more or less distortion at frequencies above 4,000 cycles/sec.

The author primarily concerns himself with sources of error in the pick-up itself. Such an instrument essentially consists of a piston transmitting the gas pressure to one side of the quartz, the other side being held in the casing. A control spring between piston and casing subjects the quartz to a certain amount of pre-compression and ensures contact between piston and quartz.

Neglecting the mass of the quartz (which can be made very small) the system has two degrees of freedom corresponding to natural oscillations of the piston relatively to the casing and the casing relatively to its attachment (e.g. engine frame).

The piston oscillations are controlled by its mass and by the elasticity of the quartz and control springs, whilst the casing oscillations depend on the mass and elasticity of the latter.

On applying a force of constant amplitude but variable frequency to the piston the compression of the quartz will become very large in the regions of the

resonance of the system and the static calibration will obviously not apply. Due to the interaction of the two components of the system, however, the amplification factor may differ from unity (the static value) at an appreciable distance from the resonance point and may even assume negative values if the two natural frequencies are fairly close together.

It is clear, therefore, that the static calibration cannot be applied with confidence unless the frequency response of the recorder is known. Although in a two-mass system this response curve might be calculated theoretically, this is no longer possible in an actual instrument which generally has more than two degrees of freedom and for which the elastic restraints and damping coefficients are not known accurately. It becomes therefore necessary to measure the frequency response curve experimentally.

In order to reproduce actual conditions, this would necessitate subjecting the piston to a gas pressure cycle of known amplitude and variable frequency. This is not being feasible, the author has adopted an indirect method in which the quartz is excited electrically and the response of the piston recorded by means of a variable air gap condenser. The difficulty in this method is to ensure that the forcing impulses are of constant amplitude over the whole range of frequencies and that no harmonics are introduced.

It can easily be shown that the two types of response curves (direct and indirect excitation) are of similar form, provided the damping in the pressure recorder is small.

The author has tested a number of commercial and some special designs of pick-ups in this manner over the frequency range 1,000 to 100,000 cycles per second, the response being plotted in the form x/xa when x and xa are the displacement (amplitude) of the piston at frequencies of to 2,000 cycles respectively.

All the records showed a considerable number of minor resonance peaks in addition to well marked principal resonance at the natural period of the system.

For the commercial types this natural frequency varied between 9,000 and 24,000 cycles per second, whilst some of the special types had a natural frequency as high as 44,000 cycles per second. This was brought about by a reduction in the mass of the piston and the employment of tubular springs for the pre-stressing. By combining spring and piston in one unit (the solid bottom of the tube acting as piston) the natural frequency can even be raised to over 100,000 cycles/sec.

It thus appears that commercial pick-ups should be suitable for frequencies ranging from 2,000 to 6,000 cycles per second, i.e. $\frac{1}{4}$ of their respective natural frequencies. At this distance the amplification factor should be substantially unity. Similarly the special designs should be up to 40,000 cycles/sec.

This, however, pre-supposes the absence of minor resonance periods inside the working range. As already pointed out, such minor disturbances exist even in the best instruments and their possible presence must be allowed for before the static calibration can be applied.

The response curves discussed above refer to the instrument proper. If the pressure recorder is used in conjunction with an unsuitable adaptor, gas vibrations of relatively low frequency and considerable amplitude may falsify the records.

All the instruments tested by the author had a relatively rigid mounting of the quartz, one surface of the latter being pressed against an abutment in the casing. When used as an engine indicator, the casing itself is liable to be subjected to accelerations of high amplitude, which on being transmitted to the quartz may falsify the pressure record.

It is interesting to note that by adopting a fully flexible mounting of the quartz, e.g. by placing it between two diaphragms fixed in the casing, it is possible to eliminate inertia effects of the quartz, i.e. the piezo electric record is no longer affected by acceleration of the instrument casing.

Such a compensation is, however, only possible if the spring constants of the two diaphragms are exactly alike, i.e. equal loads must produce equal displacements. This is very difficult to ensure when the need of precompression is considered and the different type of loading of the two diaphragms is taken into account (lower diaphragm uniform gas load, top diaphragm concentrated load).

In any case the arrangement would be useless as an engine indicator on account of change in elasticity of the diaphragms with temperature. If a piston is fitted, compensation of inertia forces requires a certain difference in the spring characteristics of the two diaphragms and this reduces the sensitivity of the pressure recorder still further. The author suggests a design in which this difficulty is overcome by loading the top diaphragm by a mass equal to that of the piston. At the same time the pre-stressing is effected by a separate internal tubular spring. It is claimed that this type of instrument would combine the advantages of high natural frequency with insensitivity to longitudinal accelerations of the casing. No experiments to substantiate this appear to have been published.

Medical Research in Some Aspects of Aircraft Design. (W. E. Russell and others, J. Aeron. Sci., Vol. 10, No. 7, July, 1943, pp. 227-231.) (115/10 U.S.A.)

In order to obtain the full advantages associated with the improvement in the performance of modern aircraft, it is essential that the resistance of the crew to physiological disturbances be raised to the highest possible pitch.

Such disturbances are associated mainly with acceleration (cerebral anæmia), rate of climb (" bends ") and altitude (Anoxia). In addition, with the increased time of flight now generally possible, we have the cumulative effects of cold and fatigue, noise and vibration.

The extra physiological stresses involved call for strict and periodic medical examination of the crew combined with educational courses during which the crew become familiarised with the symptoms heralding the onset of physiological disturbances. In this connection the low pressure chamber has proved invaluable.

The Boeing Company have developed a standard " denitrogenation " period of at least 45 minutes before any flight above 25,000 feet is allowed.

During the whole of this period, oxygen is breathed accompanied by mild physical exercise, the crew wearing standard equipment.

It is stated that this treatment has led to almost complete immunity from " bends."

There seems to be no doubt that the ill effects of prolonged flights at great altitudes can only be overcome in a satisfactory manner by the pressure cabin and its incorporation in high altitude aircraft of the future will be one of the main directions in which design will help to combat physiological hazards. The dangers of a sudden pressure release, especially in the case of combat planes, must, however, not be lost sight of and special oxygen masks capable of dealing with excess emergency requirements will have to be developed.

In addition to this major line of development, the authors are of the opinion that the designer could do much to reduce the risks during crash landings by a closer study of internal fittings in the aircraft. In an extreme crash, the aircraft practically disintegrates and the tearing, crushing and grinding injuries are nearly always fatal. In the so-called " marginal " crash, however, the main structure remains more or less intact, the injuries to the crew resulting from being projected against parts of the internal structure. If the human body could be evenly supported, very high rate of deceleration can be withstood without fatal results, and there are several cases on record where a free fall from altitudes up to 150 feet was not even accompanied by serious injuries, provided the body landed in a prone position. The author states that plans are under way for crashing planes under controlled conditions and measuring by means of

strapped dummies the distribution of the forces in the seat belts and restraining harness, as well as the motion of different parts of the dummy. It is well known that head injuries are the most common cause of fatality and the possibility of the head striking any projecting part of the internal structure during deceleration of the aircraft must be avoided. The authors are of the opinion that once experimental data are available much can be done to reduce fatal injuries during " marginal " crashes.

LIST OF SELECTED TRANSLATIONS.

No. 61.

NOTE.—Applications for the loan of copies of translations mentioned below should be addressed to the Secretary (R.T.P.3), Ministry of Aircraft Production, and not to the Royal Aeronautical Society. Copies will be loaned as far as availability of stocks permits. Suggestions concerning new translations will be considered in relation to general interest and facilities available.

Lists of selected translations have appeared in this publication since September, 1938.

AERODYNAMICS.

(*a*) COMPRESSIBILITY.

TRANSLATION NUMBER AND AUTHOR.		TITLE AND REFERENCE.
1865	Prandtl, L.	*Compressibility Effect in Air Flow.* (Schriften d. deutschen Akademie der Luftfahrtforschung, No. 30, pp. 1-16.)
1872	Prandtl, L.	*General Considerations on the Flow of Compressible Fluids.* (Proceedings of the Volta High Speed Conference, Rome, 1935, pp. 169-197.)

(*b*) NON-STEADY MOTION.

1867	Cicala, P.	*Present State of Research on the Non-Steady Motion of a Lifting Wing.* (L. Aerotecnica, Vol. 19, No. 9-12, Sept.-Dec., 1941, pp. 557-591, 670-685, 759-773.)

(*c*) CIRCULATION.

1874	——	*The Tunnel Wall Corrections of Rolling and Yawing Moments for a Model with Asymmetric Distribution of Lift.* (Rijks voor de Luchvaart, 1921-1927, pp. 240-255.)
1883	Keller, C.	*Kinetic Energy Losses Behind Blade Grids as a Result of Periodic Variation in the Circulation.* (Report of the Institute of Aerodynamics, Technische Hochschule, Zurich, 1934, pp. 167-187.)

AIRCRAFT AND ACCESSORIES.

1853	Billioque	*A Device for Automatically Maintaining the Transverse Stability of an Aircraft in the Presence of Reduced Speed Caused by Diminished Lift.* (*German Patent* 688,035.) (Flugsport, Vol. 32, No. 6, 13/3/40, p. 92.)

TRANSLATION NUMBER AND AUTHOR.		TITLE AND REFERENCE.
1862	——	*Airborne Machine Gun MG-131.* (Flugsport, Vol. 34, No. 26, Dec., 1942, pp. 407-409.)
1885	Pistolesi, E. ...	*Some Considerations on the Static Longitudinal Stability with Special Reference to Aircraft of the Canard Type.* (L. Aerotecnica, Vol. 22, No. 5, May, 1942, pp. 213-223.)

MATERIALS.

(*a*) PLASTIC AND FIBRES.

1869	Opitz, H. ... ... Reese, H.	*Wear of Plastic Gear Wheels.* (Kunststoffe, Vol. 32, No. 9, Sept., 1942, pp. 263-269.)
1873	Leilich, K.	*Plasticizers for Polyvinyl Chloride.* (Koll. Zeitschrift, Vol. 99, No. 1, April, 1943, pp. 107-113.)
1876	Ulrich, M. ... ... Miller, F.	*Strength of Gear Wheels Made from Laminated Plastics.* (Kunststoffe, Vol. 32, No. 9, Sept., 1942, pp. 270-273.)
1878	Kratky, O.	*The Mechanical Properties of Fibrous Substances in Relation to Their Molecular Structure.* (Z. f. Papier, Vol. 56, No. 1-2, 20/1/38, pp. 2-5.)

(*b*) TOOLS.

1871	Perchland, H. ...	*Wear of Cutting Tools as Affected by Their Shape.* (Der Betrieb, Vol. 21, No. 8, Aug., 1942, pp. 335-339.)
1875	Schallbrook, H. ... Bieling, W. ...	*Cutting Capacity of Re-Cut and Chemically Sharpened Files.* (Werkstatt und Betrieb, Vol. 75, No. 8, Aug., 1942, pp. 175-179.)

(*c*) LIGHT ALLOYS.

1880	Semmler, E. ...	*The Structure of Aluminium Oxide Films Used in Surface Structure Investigations by the Contact Film Method (Electron Microscopy).* (Z. f. Metallk., Vol. 34, No. 10, Oct., 1942, pp. 230-251.)
1881	Mahl, H. ... ... Pewlek, F.	*Ultra Microscopic Examinations of Aluminium Alloys.* (Z. f. Metallk., Vol. 34, No. 10, Oct., 1942, pp. 232-236.)
1882	Ardenne, M. V. ... Kircher, H.	*Comparison Between Optical and Electron Microscope Records. (Proof of Identity of Contact Film and Parent Surfaces for Hydronalium.)* (Z. f. Metallk., Vol. 34, No. 10, Oct., 1942, pp. 236-237.)

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1866	Breton, J. L. ...	*Protection Against Frost of Freshly Cast Concrete.* (Recherches et Inventions, pp. 73-74.)
1868	Pfriem, H.	*Calculation of the Temperature Fields Variable in Time Possessing Spherical Symmetry by a Difference Method.* (I.F.F., Vol. 19, No. 6, 20/6/42, pp. 197-198.)

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1870 Meyer, J.	*Calculation of Torsional Oscillation Systems Including an Elastically Mounted Epicyclic Gear.* (L.F.F., Vol. 19, No. 6, 20/6/42, pp. 199-200.)
1877 Geiger, J.	*Determination of Crankshaft Stresses in Critical Regions with Account of Damping.* (A.T.Z., Vol. 43, No. 16, 25/8/40, pp. 403-406.)
1879 Tcherayshevsky, J. H.	*Steadiness of Certain Vibrations of Turbine Discs.* (Sov. Kotloturbo, No. 3, March, 1940, pp. 102-106.)
1884 Thoma, D. ... Schilhausl, M. ...	*Stresses and Deformations Under Torsion of Thin-Walled Hollow Cylinders with Circular Cut-Out.* (L.F.F., Vol. 19, No. 6, 20/6/42, pp. 210-214.)

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2	11607	U.S.A. ...	*Suggestions for a Popular Gas Lecture.* (O. Eisenschiml, Ind. and Eng. Chem. (News Ed.), Vol. 21, No. 10, 25/5/43, pp. 760-761.)
3	11643	U.S.A. ...	*Training Flight Test Crews, Pt. II.* (E. T. Allen, Aviation, Vol. 42, No. 5, May, 1943, pp. 118-119 and 417-418.)
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13	12304	U.S.A. ...	*Training Navy Air Technicians.* (F. Tupper, Jr., Flying and Industrial Aviation, Vol. 33, No. 1, July, 1943, pp. 121-122, 130.)
14	12348	U.S.A. ...	*Organization of the U.S. Naval Air Service.* (Inter. Avia., No. 871, 26/5/43, pp. 1-7.)
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20	11781	G.B.	*The Middle East Theatre of War Operations (Map).* (Flight, Vol. 43, No. 1,820, 24/6/43, pp. A-B.)
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27	11890	G.B.	*Emergency Oxygen Unit for Use in Parachute Escape or in Case of Failure of Regular Oxygen Supply at High Altitudes.* (W. M. Boothby and others, J. Aviation Med., 1940, June, Vol. 11, No. 2, pp. 59-66. Bulletin of War Medicine, Vol. 1, No. 3, Jan., 1941, pp. 194-196.)
28	11957	G.B.	*New Vosper Air-Sea Rescue Launch.* (Flight, Vol. 43, No. 1,798, 10/6/43, p. 599.)
29	11958	G.B.	*The Dive Bomber—Design, Development and Application.* (Flight, Vol. 43, No. 1,798, 10/6/43, pp. 601-605.)
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55	12335	Germany ...	*Technical Warfare (Distribution of Shell Splinters).* (K. Justrow, Z.G.S.S., Vol. 38, No. 5, May, 1943, pp. 81-85.)
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58	11489	G.B.	*De Havilland Mosquito II.* (Inter. Avia., No. 868, 10/5/43, p. 7.)
59	11529	G.B.	*The Hawker Typhoon (Recognition Details).* (Airc. Eng., Vol. 15, No. 173, July, 1943, pp. 198-199.)
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61	11746	G.B.	*De Havilland Mosquito II.* (Inter. Avia., No. 869-870, 18/5/43, pp. 9-10.)
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69	11956	G.B.	*Spitfire V (with Clipped Wings).* (Flight, Vol. 43, No. 1,798, 10/6/43, p. 596.)
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107	11782	U.S.A. ...	*The Dive Bomber II (Various Types).* (Flight, Vol. 43, No. 1,820, 24/6/43, pp. 661-665.)
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124	12333	U.S.A. ...	*The Vought-Sikorsky Helicopter* (*Summary of Paper*). (C. L. Morris, J.S.A.E., Vol. 51, No. 6, June, 1943, p. 36.)
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130	12350	Sweden ...	*Swedish Fighter J. 22 and Bomber B. 18.* (Inter. Avia., No. 871, 26/5/43, pp. 19-20.)
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131	11948	Norway ...	*Northrop N.3PB. Floatplane* (*Photograph*). (Aeroplane, Vol. 64, No. 1,674, 25/6/43, p. 728.)
			Military Types of Aircraft (Germany).
132	11461	Germany ...	*Messerschmitt Me. 210 A-1.* (Aviation, Vol. 42, No. 4, April, 1943, pp. 235-236.)
133	11497	Germany ...	*Henschel Hs. 129 Attack Aeroplane.* (Inter. Avia., No. 868, 10/5/43, p. 16.)
134	11498	Germany ...	*Heinkel He. 116P High Altitude Reconnaissance.* (Inter. Avia., No. 868, 10/5/43, pp. 16-17.)
135	11759	Germany ...	*Messerschmitt Me. 210* (*Photograph*). (Inter. Avia., No. 869-870, 18/5/43, p. 1.)
136	11770	Germany ...	*Captured Me. 109 G2* (*Photograph*). (Aeroplane, Vol. 65, No. 1,675, 2/7/43, p. 11.)
137	11774	Germany ...	*The Junkers Ju. 90s* (*Recognition Details*). (Aeroplane, Vol. 65, No. 1,675, 2/7/43, p. 17.)
138	11975	Germany ...	*Focke Wulf F.W. 190* (*Photograph*). (Aeroplane, Vol. 64, No. 1,671, 4/6/43, p. 639.)
139	11994	Germany ...	*Messerschmitt Me. 323 Six-Motor Transport* (*Photograph*). (Aeroplane, Vol. 64, No. 1,673, June 18, 1943, p. 690.)
140	11987	Germany ...	*Retractable Floor of the Ju. 90* (*Photograph*). (Aeroplane, Vol. 64, No. 1,672, 11/6/43, p. 667.)
141	12000	Germany ...	*The Junkers Ju. 87 D1* (*Recognition Details*). (Aeroplane, Vol. 64, No. 1,673, June 18, 1943, pp. 704-705.)

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142	12264	Germany ...	*Germany's Naval Aircraft* (*B.V.* 138, *B.V.* 138*B*, *B.V.* 139, *Arado Q.R.* 196). (V. L. Grubeng, Flight, Vol. 44, No. 1,804, 22/7/43, pp. 87-91.)
143	12291	Germany ...	*Heinkel He.* 113 (*Recognition Details*). (Flying and Industrial Aviation, Vol. 33, No. 1, July, 1943, p. 71.)
			Military Types of Aircraft (Japan).
144	12247	Japan ...	*Mitsubishi* 96-2*a* (*Navy*) (*Recognition Details*). (Flight, Vol. 44, No. 1,803, 15/7/43, p. 70.)
145	12248	Japan ...	*Kawasaki KB*-97 (*Army*) (*Recognition Details*). (Flight, Vol. 44, No. 1,803, 15/7/43, p. 71.)
146	12257	Japan ...	*Mitsubishi OB* 97 (*Recognition Details*) (*Photograph*). (Flight, Vol. 43, No. 1,799, 17/6/43, p. 3.)
			Military Types of Aircraft (Italy).
147	11766	Italy	*Caproni Reggiane Re.* 2,001 *Fighters* (*Photograph*). (Aeroplane, Vol. 65, No. 1,675, 2/7/43, p. 6.)
148	11767	Italy	*Four-Motor Savoia* (*Photo in Italian Advertisement*). (Aeroplane, Vol. 65, No. 1,675, 2/7/43, p. 7.)
149	11768	Italy	*Captured Breda* 88 (*Photograph*). (Aeroplane, Vol. 65, No. 1,675, 2/7/43, p. 9.)
150	11773	Italy	*The Piaggio P.* 108*B* (*Recognition Details*). (Aeroplane, Vol. 65, No. 1,675, 2/7/43, p. 17.)
151	11780	Italy	*The Fiat R.S.* 14 *Seaplane* (*Photograph*). (Flight, Vol. 43, No. 1,820, 24/6/43, p. 660.)
152	11946	Italy	*The Fiat R.S.* 14 *Float Plane* (*Photograph*). (Aeroplane, Vol. 64, No. 1,674, 25/6/43, p. 725.)
153	12256	Italy	*Piaggio P.* 108-*B* (*Recognition Details*) (*Photograph*). (Flight, Vol. 43, No. 1,799, 17/6/43, p. a.)
154	12270	Italy	*Cant* 501 (*Photograph*). (Flight, Vol. 44, No. 1,804, 22/7/43, p. 98.)
			Troop Transport and Ambulance.
155	11335	Germany ...	*Ju.* 87 *Equipped for Medical Flight Research*. (D. V. Diringshofen, Flugsport, Vol. 35, No. 9, 19/5/43, pp. 108-111.)
156	11492	U.S.A. ...	*Lockheed Constellation Transport*. (Inter. Avia., No. 868, 10/5/43, p. 9.)
157	11494	U.S.A. ...	*America's Naval Transport Type Designation*. (Inter. Avia., No. 868, 10/5/43, p. 10.)
158	11761	G.B.	*Airspeed "Horsa" Troop Transport Glider* (*Photo*). (Inter. Avia., No. 869-870, 18/5/43, p. 11.)
159	11954	U.S.A. ...	*U.S. Air Transport*. (Aeroplane, Vol. 64, No. 1,674, 25/6/43, p. 741.)
160	11961	G.B.	*Four-Engined Transport Aircraft* (*Photographs*). (Flight, Vol. 43, No. 1,798, 10/6/43, pp. 607-609.)
161	12245	U.S.A. ...	*American War Cargo Transport Types*. (Flight, Vol. 44, No. 1,803, 15/7/43, p. 68.)
162	12250	Germany ...	*Me.* 323 *Transport Aircraft* (*Photograph*). (Flight, Vol. 43, No. 1,799, 17/6/43, p. 626.)
163	12251	G.B.	*Bristol Bombay Ambulance* (*Photograph*). (Flight, Vol. 43, No. 1,799, 17/6/43, p. 627.)

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164	12279	U.S.A. ...	*The Consolidated "Liberator Express."* (Flying and Industrial Aviation, Vol. 33, No. 1, July, 1943, pp. 28-29.)
165	12289	U.S.A. ...	*Douglas "Skymaster" (Recognition Details).* (Flying and Industrial Aviation, Vol. 33, No. 1, July, 1943, p. 70.)
			Carriers, Naval Balloons.
166	11963	G.B.	*Naval Mark VI Kite Balloons (Photograph).* (Flight, Vol. 43, No. 1,797, 3/6/43, p. 572.)
167	12278	U.S.A. ...	*Mass Production Carriers.* (R. Sydney, Flying and Industrial Aviation, Vol. 33, No. 1, July, 1943, pp. 25-26, 142.)
			Gliders.
168	11449	U.S.A. ...	*Assembly Breakdown and Detail Drawing of Landing Gear on Aeronca TG-S Training Glider.* (Aviation, Vol. 42, No. 4, April, 1943, p. 183.)
169	11510	G.B.	*First Atlantic Flight of Freight Glider.* (Engineer, Vol. 176, No. 4,565, 9/7/43, p. 21.)
170	11629	U.S.A. ...	*Aeronca TG-5 Training Glider (Drawing).* (Aviation, Vol. 42, No. 5, May, 1943, p. 207.)
171	11952	G.B.	*Airspeed Horsa I Glider (Photograph).* (Aeroplane, Vol. 64, No. 1,674, 25/6/43, p. 736.)
172	12244	G.B.	*Airspeed Horsa Troop-Carrying Glider.* (Flight, Vol. 44, No. 1,803, 15/7/43, p. 64.)
173	12255	Germany ...	*Axis Report of New German Altitude Glider.* (Flight, Vol. 43, No. 1,799, 17/6/43, p. 634.)
			Anti-Tank and Artillery Practice.
174	11785	U.S.A. ...	*Fire Power for Victory.* (By Maj.-Gen. Levin H. Campbell, Jr., Army Ordnance, Vol. 24, No. 138, May-June, 1943, pp. 493-495.)
175	11787	U.S.A. ...	*New Tank Destroyer M. 10 (Photograph).* (Army Ordnance, Vol. 24, No. 138, May-June, 1943, p. 502.)
176	11788	U.S.A. ...	*New 3-inch Mobile Anti-Tank Gun (Photograph).* (Army Ordnance, Vol. 24, No. 138, May-June, 1943, p. 502.)
177	11792	U.S.A. ...	*American Artillery (Photograph).* (Army Ordnance, Vol. 24, No. 138, May-June, 1943, pp. 513-520.)
178	11793	U.S.A. ...	*Prevention Maintenance, Pt. III. The Mechanic's Rôle in the Field.* (By Brig.-Gen. J. Kirk, Army Ordnance, Vol. 24, No. 138, May-June, 1943, pp. 542-544.)
179	11794	G.B.	*The British 6-Pounder Anti-Tank Gun.* (By H. Rowan Robinson, Army Ordnance, Vol. 24, No. 138, May-June, 1943, pp. 545-546.)
180	11796	U.S.A. ...	*New Ordnance Weapon "Bazooka."* (Army Ordnance, Vol. 24, No. 138, May-June, 1943, pp. 550-551.)

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AERODYNAMICS AND HYDRODYNAMICS.

Profile Theory.

181	12392	Germany ...	*Aspect Ratio Correction Factor for Rectangular Elliptical and Quasi-Elliptical Wings.* (*Profile series No.* 38.) (J. Kleinwächteiz, Flugsport, Vol. 35, No. 11, 14/7/43, pp. 153-156.)
182	12715	Germany ...	*Contribution to Profile Theory—V* (*Theory of the Method of Singularities*). (H. B. Helmbold, L.F.F., Vol. 20, No. 6, 30/6/43, pp. 192-195.)
183	12716	Germany ...	*Contribution to Profile Theory—VI. Second Approximation to the Calculation of the Velocity Distribution by the Method of Singularities.* (F. Keune, L.F.F., Vol. 20, No. 6, 30/6/43, pp. 196-206.)
184	12719	Germany ...	*Two-Dimensional Theories of the Slotted Flap for Infinitely Thin Profiles.* (A. Kupper, L.F.F., Vol. 20, No. 1, 20/1/43, pp. 22-28.)

Air and Gas Flow.

185	11372	G.B.	*Fluid Flow Through Restrictions.* (L. S. Greenland, Airc. Eng., Vol. 15, No. 172, June, 1943, pp. 160-164.)
186	11444	U.S.A. ...	*Air Flow Visualization Opens New Avenues of Research.* (E. T. Saxl, Aviation, Vol. 42, No. 4, April, 1943, pp. 148-151 and 326-329.)
187	11575	Germany ...	*Equations of Flow for Gas-Liquid Mixtures* (*Foam*). (G. Heinrich, Z.A.M.M., Vol. 22, No. 2, April, 1942, pp. 117-118.)
188	12714	Germany ...	*On an Approximate Method for Determining the Two-Dimensional Potential Flow of a Compressible Fluid.* (W. Gröbner, L.F.F., Vol. 20, No. 6, 30/6/43, pp. 184-191.)
189	12720	Germany ...	*The Flow of Compressible Fluids about Solid Bodies* (*about Subsonic Speeds*). (F. Eser, L.F.F., Vol. 20, No. 7, 20/7/43, pp. 220-230.)
190	12721	Germany ...	*The Theory of the Unsteady Compression Shock* (*Two-Dimensional Problem*) (*Gas Flow*). (R. Sauer, Ing. Archiv., Vol. 14, No. 1, 1943, pp. 14-20.)
191	12722	Germany ...	*Unsteady Gas Flow in Nozzles and Diffusors with Some Notes on Flow having Spherical Symmetry.* (F. Schultz-Grunow, Ing. Archiv., Vol. 14, No. 1, 1943, pp. 21-29.)
192	12733	Germany ...	*The Experimental Solution of Two-Dimensional Potential Problems by Electrical Dipole Fields.* (K. Schmidt, Ing. Archiv., Vol. 14, No. 1, 1943, pp. 30-52.)

Turbulence.

193	12717	Germany ...	*Some Notes on the Theory of Free Turbulence.* (L. Prandtl, Z.A.M.M., Vol. 22, No. 5, Oct., 1942, pp. 241-243.)

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194	12718	Germany ...	*A New Approximate Method for the Numerical Evaluation of Free Turbulence Problems.* (H. Görtler, Z.A.M.M., Vol. 22, No. 5, Oct., 1942, pp. 244-254.)
195	12724	U.S.A. ...	*Tail Buffeting.* (G. Abdrashitov, Trans. C.A.H.I., No. 395, Moscow, 1939.) (R.T.P. Trans. No. T.M. 1,041.)
			Boundary Layer.
196	12725	Germany ...	*The Heat Transfer to a Plate in Flow at High Speed.* (E. Eckert, O. Drewitz, Forschung, Vol. 11, No. 3, May-June, 1940.) (R.T.P. Trans. No. T.M. 1,045.)
197	12726	Germany ...	*Heat Transfer of Aerofoils and Plates.* (O. Seibert, Jahrbuch der deutsche, L.F.F., 1938, pp. 11, 245-256.) (R.T.P. Trans. T.M. 1,044.)
			Axial Fan Performance.
198	12727	U.S.S.R. ...	*Theoretical Determination of Axial Fan Performance.* (E. Struve, C.A.H.I., Report No. 295, Moscow, 1937.) (Available as R.T.P., Trans. No. T.M. 1,042.)
			Two-Stage Turbo Blower Investigations.
199	12728	U.S.S.R. ...	*Experimental Investigation of a Model of a Two-Stage Turbo Blower.* (S. Dovjik and W. Polikovsky, C.A.H.I., Report No. 191, Moscow, 1935.) (R.T.P., Trans. No. T.M. 1,043.)
			Hydrodynamic Equations.
200	12320	G.B.	*The Equations of Hydrodynamics in a Very General Form.* (R. and M. 1903, Nov., 1942.)
			AIRCRAFT, AIRSCREWS AND ACCESSORIES.
			Civil Transport and Air Cargo.
201	11756	G.B.	*British Civil Aviation Crisis.* (Inter. Avia., No. 869-870, 18/5/43, pp. 27-28.)
202	11758	Germany ...	*Stuttgart Air Transport Research.* (Inter. Avia., No. 869-870, 18/5/43, p. 30.)
203	11765	G.B.	*Memorandum of S.B.A.C. on Air Transport.* (Aeroplane, Vol. 65, No. 1,675, 2/7/43, pp. 4-5.)
204	11923	Canada ...	*The Skyways are the Highways of To-morrow.* (W. A. Hunter, B.A., Commercial Aviation, Vol. 5, No. 2, March, 1943, pp. 22-37.)
205	11955	G.B.	*Post-War Transport Aircraft—II (Wilbur Wright Memorial Lecture).* (Aeroplane, Vol. 64, No. 1,674, 25/6/43, pp. 742-742a.)
206	11962	G.B.	*Post-War Transport Aircraft (Wilbur Wright Memorial Lecture) (Contd.).* (Flight, Vol. 43, No. 1,798, 10/6/43, pp. 612-617.)
207	11968	G.B.	*Post-War Transport Aircraft (31st Wilbur Wright Memorial Lecture).* (E. P. Warner, Flight, Vol. 43, No. 1,797, 3/6/43, pp. 581-586.)
208	11969	G.B.	*Commercial Air Transport—its Past History and Future Prospects.* (Sir F. Handley Page, Flight, Vol. 43, No. 1,797, 3/6/43, pp. 586-587.)

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209	11982	G.B.	*Post-War Transport Aircraft* (*31st Wilbur Wright Memorial Lecture*). (Aeroplane, Vol. 64, No. 1,671, 4/6/43, pp. 654-657.)
210	11984	G.B.	*Commercial Air Transport.* (Sir F. Handley Page, Aeroplane, Vol. 64, No. 1,671, 4/6/43, p. 637.)
211	11991	G.B.	*Post-War Transport Aircraft* (*31st Wilbur Wright Memorial Lecture*) (*Contd.*) (E. Warner, Aeroplane, Vol. 64, No. 1,672, 11/6/43, pp. 683-685.)
212	12002	G.B.	*Post-War Transport Aircraft* (*31st Wilbur Wright Memorial Lecture*) (*Contd.*). (Aeroplane, Vol. 64, No. 1,673, June 18, 1943, pp. 712-714.)
213	12214	G.B.	*Post-War Transport Aircraft* (*31st Wilbur Wright Memorial Lecture*). (E. P. Warner, Engineering, Vol. 156, No. 4,046, July 30, 1943, pp. 95-96.)
214	12258	——	*Post-War Transport Aircraft—Pt. III* (*Wilbur Wright Memorial Lecture*). (Flight, Vol. 43, No. 1,799, 17/6/43, pp. 635-638.)
215	12282	U.S.A. ...	*Transporting Curtiss P-40 in a Douglas "Skytrain."* (Flying and Industrial Aviation, Vol. 33, No. 1, July, 1943, p. 47.)
216	12327	U.S.A. ...	*Packaging and Handling of Air Cargo.* (C. G. Peterson, J.S.A.E., Vol. 51, No. 6, June, 1943, pp. 210-219.)
217	12352	G.B.	*Civil Aviation Development in the U.S.A. and G.B.* (Inter. Avia., No. 871, 26/5/43, pp. 22-25.)
			Civil Aircraft Types.
218	11500*	France ...	*Caudron C.R. 920 Mail Aeroplane.* (Inter. Avia., No. 868, 10/5/43, p. 17.)
219	12351	G.B.	*N.N.H. Racing Aircraft* (*Nuffield-Napier-Heston*). (Inter. Avia., No. 871, 1, 26/5/43, pp. 11-12.)
			Testing and Stability.
220	11499	Italy	*Italian Safety Competition* (*Santangels Stall Indicator*). (Inter. Avia., No. 868, 10/5/43, p. 17.)
221	11528	G.B.	*The Latest Stability of Aeroplanes—A New Geometrical System of Analysis.* (H. L. Price, Airc. Eng., Vol. 15, No. 173, July, 1943, pp. 193-198.)
222	11565	U.S.A. ...	*General Instability of Monocoque Cylinders.* (N. J. Hoff, J. Aeron. Sci., Vol. 10, No. 4, April, 1943, pp. 105-114.)
223	11657	U.S.A. ...	*Streamlining Dynamic Stability Computations—Pt. I.* (M. M. Munk, Aero Digest, Vol. 42, No. 5, May, 1943, pp. 205-206 and 288.)
			Structural Design.
225	10991	U.S.A. ...	*Aircraft Standards Index* (*Standards Adopted by S.A.E. and N.A.S.C.*). (Autom. Ind., Vol. 88, No. 6, 15/3/43, pp. 100 and 193-200.)
226	11527	G.B.	*Analytical Geometry in Common Layouts—II. Folding Wings Employing a Skew Hinge Axis.* (K. W. Hetzel and S. J. Garvey, Airc. Eng., Vol. 15, No. 173, July, 1943, pp. 188-192.)

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227	11530	G.B.	...	*Aircraft Structural Research.* (F. R. Shanley, Airc. Eng., Vol. 15, No. 173, July, 1943, pp. 200-206.)
228	11597	G.B.	...	*Plastics in Aircraft Construction.* (D. W. Brown, Plastics, Vol. 7, No. 74, July, 1943, pp. 296-301.)
229	11624	U.S.A.	...	*Points on Plastics in Aircraft Engineering—Pt. II.* (J. Sasso, Aviation, Vol. 42, No. 5, May, 1943, pp. 187-190 and 360-363.)
230	11649	U.S.A.	...	*Cellulose Acetate Sheet Plastic for Aircraft.* (W. E. Moeller, Aero Digest, Vol. 42, No. 5, May, 1943, pp. 183-191.)
231	11653	U.S.A.	...	*Non-Ferrous Alloys for Aeroplanes and Engines.* (J. B. Johnson, Aero Digest, Vol. 42, No. 5, May, 1943, pp. 169-171.)
232	11700	U.S.A.	...	*Problems Affecting the Uses of Wood in Aircraft.* (R. W. Hess, A.S.M.E. Preprint, April 26-28, 1943.)
233	11753	U.S.A.	...	*Inst. of Aeron. Sci., 11th Annual Meeting, List of Papers.* (Inter. Avia., No. 869-870, 18/5/43, pp. 16-17.)
234	11800	U.S.A.	...	*Problems in Aircraft Structural Research.* (By F. R. Shanley, Mechanical Engineering, Vol. 65, No. 3, March, 1943, pp. 169-178.)
235	11805	U.S.A.	...	*Moulded Plastic Bonded Veneers and Wood in Aircraft Construction.* (By R. J. Nebesar, Mechanical Engineering, Vol. 65, No. 3, March, 1943, pp. 197-201.)
236	11820	Switzerland	...	*The Aerodynamic Design of Wing Strut Roots.* (By W. Pfenninger, from Flugwehr und Technik, No. 9, 1942, pp. 237-241.) (Engineer's Digest, Vol. 4, No. 2, Sept., 1943, pp. 57-60.)
237	11925	Canada	...	*Progress in Aircraft Plywood.* (T. D. Parry, Commercial Aviation, Vol. 5, No. 2, March, 1943, pp. 44-45.)
238	11926	Canada	...	*Aircraft Plastics.* (J. Delmonte, Commercial Aviation, Vol. 5, No. 2, March, 1943, pp. 88-94.)

Accessories (Windscreens, Gears, etc.).

239	11356	Germany	...	*Control Rod Mounting for Pressure Cabins.* (*Pat. series No.* 4, 732,595.) (Messerschmitt, Flugsport, Vol. 35, No. 9, 19/5/43, p. 27.)
240	11357	Germany	...	*Fowler Flap with Aileron Action.* (*Pat. series No.* 4, 732,917.) (Heinkel, Flugsport, Vol. 35, No. 9, 19/5/43, p. 23.)
241	11462	U.S.A.	...	*Bird Proof Windshield.* (Aviation, Vol. 42, No. 4, April, 1943, p. 237.)
242	11540	G.B.	...	*Spray Shields for Seaplanes* (*Lumarith Plastic Sheets*). (British Plastics, Vol. 15, No. 170, July, 1943, p. 91.)
243	11664	U.S.A.	...	*Bevel Gears in Aircraft—Pt. II.* (A. H. Candee, Aero Digest, Vol. 42, No. 5, May, 1943, pp. 314, 317-318, 328.)
244	11743	U.S.A.	...	*Protection of Landing Wheel Tyres.* (C. R. Mason and W. H. Elliot, S.A.E. Nat. Aeron. Meeting Preprint, April 8-9, 1943.)

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245	11744	U.S.A. ...	*New Wind Shield Developments.* (A. L. Morse, S.A.E. Preprint, Nat. Aeronautic Meeting, April 8-9, 1943.)
246	12281	U.S.A. ...	*Bird Proof Windshields.* (A. L. Morse, Flying and Industrial Aviation, Vol. 33, No. 1, July, 1943, pp. 40-42.)
247	12331	U.S.A. ...	*Symposium on Remote Control for Aircraft.* (J.S.A.E., Vol. 51, No. 6, June, 1943, pp. 33-40.)
			Propellers and Fans.
248	11359	G.B.	*Propellers for Merchant Ships.* (Machinery, Vol. 63, No. 1,604, 8/7/43, pp. 36-41.)
249	11373	G.B.	*Eleventh Annual Meeting of the Institute of Aeron. Sci. (Review of Papers, etc.).* (A. Klemlin, Airc. Eng., Vol. 15, No. 172, June, 1943, pp. 165-173.)
250	11566	U.S.A. ...	*A Tabular Method of Propeller Blade Stress Analysis.* (J. Stuart, Vol. 10, No. 4, April, 1943, pp. 115-118.)
251	11617	U.S.A. ...	*The Problem of Opposite Propeller Rotation, Inboard or Outboard?* (J. H. Hamlet, Aviation, Vol. 42, No. 5, May, 1943, pp. 156-161 and 393.)
253	11829	G.B.	*Design and Operation of Axial Flow Fans.* (Sheet Metal Industry, Vol. 17, No. 192, April, 1942, p. 648.)
254	12216	G.B.	*Rotol V.P. Marine Propellers.* (Engineering, Vol. 156, No. 4,046, July 30, 1943, p. 93.)
255	12287	U.S.A. ...	*The Use of Counter-Rotating Propellers.* (T. B. Martin, Flying and Industrial Aviation, Vol. 33, No. 1, July, 1943, pp. 67-68, 165-166.)
			Airports and Hangars.
256	10970	G.B.	*Land Drainage Machinery.* (Engineer, Vol. 175, No. 4,560, 4/6/43, pp. 442-443.)
257	11466	U.S.A. ...	*Wood Replaces Steel in New Blimp Hangars.* (Aviation, Vol. 42, No. 4, April, 1943, p. 307.)
258	11551	G.B.	*Problems of Land Drainage.* (E. Lathan, Engineering, Vol. 156, No. 4,043, 9/7/43, pp. 22-24.)
259	11738	G.B.	*Aerodrome Abstracts Compiled by D.S.T.R. (Road Research Laboratory).* (Vol. 11, No. 4.) (Abstract Nos. 59-77.)
260	12084	U.S.A. ...	*Report of Committee D. 18 on Soils for Engineering Purposes, Preprint No. 79.* (A.S.T.M., 1943 Preprints, June 28-July 2, 1943.)
261	12283	Canada ...	*Mobile Airport Control.* (J. Montagnes, Flying and Industrial Aviation, Vol. 33, No. 1, July, 1943, pp. 50, 102.)
262	12284	U.S.A. ...	*Post-War Air Terminals.* (H. J. Lubig, Flying and Industrial Aviation, Vol. 33, No. 1, July, 1943, pp. 60-61, 160.)
			Servicing and Maintenance.
263	11389	U.S.A. ...	*Correct Repair of Transparent Sections.* (B. MacIntosh, Aviation, Vol. 42, No. 3, March, 1943, p. 248.)
264	11457	U.S.A. ...	*Aircraft Servicing Organisation.* (A. L. Fornoff, Aviation, Vol. 42, No. 4, April, 1943, pp. 211-213 and 355-359.)

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265	11635	U.S.A. ...	*Tail Inspection Stand.* (Aviation, Vol. 42, No. 5, May, 1943, p. 239.)
266	11641	U.S.A. ...	*American Modification Centre in England.* (M. V. Cave, Aviation, Vol. 42, No. 5, May, 1943, pp. 255 and 410.)
267	11941	Canada ...	*Aircraft Maintenance and Overhaul.* (E. J. Hatton, Commercial Aviation, Vol. 5, No. 2, Feb., 1943, pp. 94-98.)
268	11951	G.B.	*Naval Air Dockyard.* (Aeroplane, Vol. 64, No. 1,674, 25/6/43, pp. 732-734.)
269	11999	G.B.	*Naval Air Dockyard—I.* (Aeroplane, Vol. 64, No. 1,673, June 18, 1943, pp. 699-701.)

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Named Types.

270	11778	G.B.	*The Cheetah X Engine.* (Flight, Vol. 43, No. 1,820, 24/6/43, pp. 656-657.)
271	11988	Germany ...	*The 1,600 h.p. B.M.W. 801 Aero Motor (Detailed Photographs).* (Aeroplane, Vol. 64, No. 1,672, 11/6/43, pp. 671-672.)
272	12220	G.B.	*"Jumo" 211 A., B. and D. Fuel Injection System.* (Engineer, Vol. 176, No. 4,569, 6/8/43, pp. 113-116.)
273	12227	Germany ...	*Diesel Engines for Ships.* (E. Ehmsen, Schiff und Werft, Vol. 44-24, No. 11-12, June, 1943, pp. 181-186.)

Design and Installation.

274	11621	U.S.A. ...	*Advantages of Forged Engine Mounts.* (Ch. Frey, Avation, Vol. 42, No. 5, May, 1943, pp. 176 and 394-397.)
275	11626	U.S.A. ...	*Welded Seam Inlet Elbows for Pratt and Whitney Engines.* (Aviation, Vol. 42, No. 5, May, 1943, pp. 199 and 393.)
276	11628	U.S.A. ...	*Details of Engine Mount Installed on Fleetwings B.T. 12 Basic Trainer.* (Aviation, Vol. 42, No. 5, May, 1943, p. 205.)

Performance and Operation.

277	11618	U.S.A. ...	*Power Generation for Aircraft Engines.* (R. L. Findley, Aviation, Vol. 42, No. 5, May, 1943, pp. 162-165 and 351.)
279	11742	U.S.A. ...	*Operating Temperature and Stresses of Aluminium Aircraft Engine Parts.* (E. J. Willis and R. G. Anderson, S.A.E. Nat. Aeronautic Meeting, April 8-9, 1943.)
280	11746	U.S.A. ...	*Operating Characteristics of Lubrication Systems for an Aircraft Power Plant Installation Under Simulated Altitude Conditions (Sea Level to 40,000 Feet).* (H. A. Scrymgeour, S.A.E. Preprint, Nat. Aeronautic Meeting, April 8-9, 1943.)
281	12326	U.S.A. ...	*Influence of Engine Adjustment and Octane Number on Performance of Commercial Engines.* (D. P. Brenz and others, J.S.A.E., Vol. 51, No. 6, June, 1943, pp. 198-209.)
282	12332	U.S.A. ...	*Storage Battery Performance at Low Temperature (Summary of Paper).* (J. H. Little, J.S.A.E., Vol. 51, No. 6, June, 1943, p. 36.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
			Pumps, Turbines, Superchargers.
283	11666	U.S.A.	... *The Pesco Rotary Air Pumps.* (Aero Digest, Vol. 42, No. 5, May, 1943, p. 331.)
284	12211	G.B. ...	... *Hydrostatically Operated Chemical Dozing Pump.* (Engineering, Vol. 156, No. 4,046, July 30, 1943, pp. 86-87.)
285	12325	U.S.A.	... *The Elliott-Lysholm Supercharger.* (A. Lysholm and others, J.S.A.E., Vol. 51, No. 6, June, 1943, pp. 193-197.)
286	12230	Germany	... *Possibilities of the Combustion Turbine Applied to Ship Propulsion.* (R. Schmid, Schiff und Werft, Vol. 44-24, No. 11-12, June, 1943, pp. 199-200.)
287	11701	U.S.A.	... *Theory of the Expanding of Boiler and Condenser Tube Joints Through Rolling.* (A. Nadai, A.S.M.E. Preprint, April 26-28, 1943.)
288	12015	U.S.A.	... *Requirements for Relief of Over-Pressure in Vessels Exposed to Fire.* (J. J. Duggan and others, Preprints of Papers Presented at the Los Angeles Meeting of the A.S.M.E., June 14-17, 1943.)
289	12016	U.S.A.	... *Temperature Relations in Journal Bearing Systems.* (M. Muskat and F. Morgan, Preprints of Papers Presented at the Los Angeles Meeting of the A.S.M.E., June 14-17, 1943.)
			Thermodynamics, Deposit Analysis.
290	12017	U.S.A.	... *Investigation of Large Diesel Engine Wrist Pins, Pistons and Crankcase Explosions.* (F. E. Faast, Preprint of Papers Presented at the Los Angeles Meeting of the A.S.M.E., June 14-17, 1943.)
			Accessories (Plugs, Piston Rings, etc.).
291	11047	G.B. ...	... *New Flexible Shaft Coupling.* (Engineering, Vol. 155, No. 4,039, 11/6/43, p. 476.)
292	11205	Germany	... *Locking Device for Cowlings.* (*Pat. series No.* 3, 730,269.) (Messerschmitt, Flugsport, Vol. 35, No. 8, 21/4/43, p. 17.)
293	11371	G.B. ...	... *Engine Crankshaft Frequency Curves.* (J. Morris and W. J. Evans, Airc. Eng., Vol. 15, No. 172, June, 1943, pp. 136-139 and 164.)
294	11637	U.S.A.	... *Cowl Flap Stand.* (Aviation, Vol. 42, No. 5, May, 1943, p. 243.)
295	12018	U.S.A.	... *Cylinder and Ring Life with Porous Chromium Plated Rings.* (T. C. Jarrett, Preprint of Papers Presented at the Los Angeles Meeting of the A.S.M.E., June 14-17, 1943.)
296	12019	U.S.A.	... *Porous Chromium in Engine Cylinders.* (R. Pyles, Preprints of Papers Presented at the Los Angeles Meeting of the A.S.M.E., June 14-17, 1943.)
297	12241	G.B. ...	... *Oil Seals.* (Automobile Engineer, Vol. 33, No. 438, July, 1943, pp. 291-293.)
298	12266	G.B. ...	... *Thermocouple Plugs.* (Flight, Vol. 44, No. 1,804, 22/7/43, pp. 94-95.)
			Repair and Maintenance.
299	10764	G.B. ...	... *Reclaiming Worn Parts.* (Autom. Eng., Vol. 33, No. 435, April, 1943, pp. 165-167.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
300	11039	G.B.	*Repair of Damaged Aero Engines.* (Engineer, Vol. 175, No. 4,561, 11/6/43, pp. 470-472.)
301	11448	U.S.A. ...	*Proper Care of Compressed Air Plants.* (E. C. Powers, Aviation, Vol. 42, No. 4, April, 1943, pp. 179-180 and 389-390.)
302	11632	U.S.A. ...	*Engine Overhaul Station for Training Planes.* (J. R. Horton, Aviation, Vol. 42, No. 5, May, 1943, pp. 231-235 and 363-367.)
303	11636	U.S.A. ...	*Engine Nacelle Storage and Overhaul Dolly.* (Aviation, Vol. 42, No. 5, May, 1943, p. 241.)
304	11934	Canada ...	*Engine Maintenance for the R.C.A.F. (Photographs).* (Commercial Aviation, Vol. 5, No. 2, Feb., 1943, pp. 124-126.)
305	12329	U.S.A. ...	*"Cold Weld" Repairs for Salvaging Cracked Cylinder Blocks.* (J.S.A.E., Vol. 51, No. 6, June, 1943, pp. 25-26.)
306	12330	U.S.A. ...	*Metal Spraying for Repair Work.* (J.S.A.E., Vol. 51, No. 6, June, 1943, pp. 25-26.)
307	11638	U.S.A. ...	*Spark Plug Tester.* (Aviation, Vol. 42, No. 2, May, 1943, p. 243.)
			Testing and Analysis.
308	11703	U.S.A. ...	*Chemical Removal of Scale from Heat Exchange Equipment.* (F. N. Alquist and others, A.S.M.E. Preprint, April 26-28, 1943.)
309	11710	U.S.A. ...	*Removal of Water-Insoluble Turbine Deposits by Caustic Washing.* (W. L. Webb, A.S.M.E. Preprint, April 26-28, 1943.)
310	12196	U.S.A. ...	*Applicability of the Schwartz-Gurney Method for Determining Dissolved Oxygen in Boiler Feedwater and Modification of the Method to Make it Especially Applicable in the Presence of such Impurities as are Encountered in Power Plants. (Preprint No. 91.)* (R. C. Ulmer and others, A.S.T.M., 1943, Preprints, June 28-July 2, 1943.)
311	12197	U.S.A. ...	*X-Ray Diffraction Methods in the Study of Power Plant Deposits. (Preprint No. 93.)* (C. E. Imhoff and L. A. Burkardt, A.S.T.M., 1943 Preprints, June 28-July 2, 1943.)
312	12198	U.S.A. ...	*Diagnosis of Water Problems at Linto Station. (Preprint No. 94.)* (E. P. Partridge and others, A.S.T.M., 1943 Preprints, June 28-July 2, 1943.)
313	12199	U.S.A. ...	*The Interpretation of Analyses and Problems Enumerated in Water Deposits. (Preprint No. 95.)* (J. A. Holmes and A. O. Walker, A.S.T.M., 1943 Preprints, June 28-July 2, 1943.)
			General.
314	10985	G.B.	*Technical Abstracts issued by the Aero Engine Dept., Bristol Aeroplane Co., Ltd.* (Vol. 8, No. 22, 3/6/43.)
315	11470	U.S.A. ...	*38th Annual Meeting of the S.A.E.* (Aviation, Vol. 42, No. 4, April, 1943, pp. 177 and 394-395.)
316	11714	G.B.	*Rolls-Royce Technical Abstracts and Information, issued by Rolls-Royce Aero Engine Dept.* (Vol. 111, No. 6, June, 1943.)

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317	11728	G.B.	*Technical Abstracts issued by Aero Engine Dept., Bristol Aeroplane Co.* (Vol. 8, No. 23, 10/6/43.)
318	11729	G.B.	*Technical Abstracts issued by Aero Engine Dept., Bristol Aeroplane Co.* (Vol. 8, No. 24, 17/6/43.)
319	11730	G.B.	*Technical Abstracts issued by Aero Engine Dept., Bristol Aeroplane Co.* (Vol. 8, No. 25, 24/6/43.)
320	11731	G.B.	*Technical Abstracts issued by Aero Engine Dept., Bristol Aeroplane Co.* (Vol. 9, No. 1, 1/7/43.)
321	11732	G.B.	*Technical Abstracts issued by Aero Engine Dept., Bristol Aeroplane Co.* (Vol. 9, No. 2, 8/7/43.)
322	11733	G.B.	*Technical Abstracts issued by Aero Engine Dept., Bristol Aeroplane Co.* (Vol. 9, No. 3, 15/7/43.)
323	12249	G.B.	*Rolls-Royce Engine School.* (Flight, Vol. 44, No. 1,803, 15/7/43, pp. 72-74.)

FUELS AND LUBRICANTS.

Aviation Fuel.

324	12072	U.S.A. ...	*Report of Committee D. 2 on Petroleum Products and Lubricants (including Appendices: Tests for Knock Characteristics of Aviation Fuels and Motor Fuels; Ignition Quality of Diesel Fuels). (Preprint No. 68.)* (A.S.T.M., 1943 Preprints, June 28-July 2, 1943.)
325	12202	U.S.A. ...	*War Products from Petroleum (Aviation Fuel, Explosives, Rubber).* (F. J. Van Antwerpen, Ind. Eng. and Chem (News Edition), Vol. 21, No. 12, 25/6/43, pp. 900-959, 986-987.)

Gaseous Fuels.

326	11507	G.B.	*The Application of Town Gas to Industrial Drying Processes, Tech. Bull., June,* 1943. (J. of the Inst. of Prod. Engs., Vol. 22, No. 6, June, 1943, pp. 22-27.)
327	11550	Australia ...	*Town Gas for Motor Vehicles.* (Engineer, Vol. 176, No. 4,566, 16/7/43, p. 58.)
328	11687	G.B.	*The Calorific Value of Gas.* (J. E. Davis, Mech. World, Vol. 114, No. 2,949, 9/7/43, pp. 46-48.)
329	12073	U.S.A. ...	*Report of Committee D. 3 on Gaseous Fuels. (Preprint No. 69.)* (A.S.T.M., 1943 Preprints, June 28-July 2, 1943.)
330	12204	U.S.A. ...	*The Future of Natural Gas and its Derivatives.* (K. S. Adams, Ind. Eng. and Chem. (News Edition), Vol. 21, No. 12, 25/6/43, pp. 967-968.)
331	12312	U.S.A. ...	*War Products from Natural Gas and Natural Gasoline.* (P. M. Rhigorodsky and F. H. Dotterweich, National Petroleum News, Vol. 35, No. 15, 14/4/43, pp. 14-16.)

Oils and Lubricants.

332	12237	G.B.	*Oil Additives—The Trend of Modern Lubrication Practice.* (E. W. Steinitz and F. J. Grose, Automobile Engineer, Vol. 33, No. 438, July, 1943, pp. 273-275.)
333	12272	U.S.A. ...	*Frequency of Motor Oil Changes Under Wartime Driving Conditions (Need for 60-Day Oil Change).* (National Petroleum News, Vol. 35, No. 23, 9/6/43, pp. 32-33.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
334	12273	U.S.A.	... *Latest Technique in Combating Oil Fires.* (National Petroleum News, Vol. 35, No. 23, 9/6/43, pp. 34-37.)
335	12308	U.S.A.	... *Speeding Products of Oil to War, New River Craft.* (National Petroleum News, Vol. 35, No. 21, 26/5/43, pp. 26-33.)
336	12311	U.S.A.	... *Manifold System at Pan-American's Texas City Pumping Station (Crude Oil).* (National Petroleum News, Vol. 35, No. 17, 28/4/43, p. 20.)
			Coals and Coke.
337	11705	U.S.A.	... *Iowa Coals in the National Emergency.* (H. L. Olin, A.S.M.E. Preprint, April 26-28, 1943.)
338	12076	U.S.A.	... *Report of Committee D. 5 on Coal and Coke. (Preprint 71.)* (A.S.T.M., 1943 Preprints, June 28-July 2, 1943.)
339	12090	U.S.A.	... *The Gieseler Method for Measurement of the Plastic Characteristics of Coal. (Preprint No. 86.)* (G. C. Soth and C. C. Russell, A.S.T.M., 1943 Preprints, June 28-July 2, 1943.)
			General (Economy, Research, etc.).
340	11735	G.B. ...	... *Fuel Research Intelligence Section. Summary for Two Weeks ending 22 and 29 May,* 1943.
341	11736	G.B. ...	... *Fuel Research Intelligence Section. Summary for Two Weeks ending 5 and 15 June,* 1943.
342	11737	G.B. ...	... *Fuel Research Intelligence Section. Summary for Three Weeks ending 19 and 26 June and 3 July,* 1943.
343	12306	U.S.A.	... *Patent for Production of a "Balanced Motor Fuel."* (National Petroleum News, Vol. 35, No. 21, 26/5/43, p. 16.)
344	12307	U.S.A.	... *Catalytic Refining Patent.* (National Petroleum News, Vol. 35, No. 21, 26/5/43, p. 16.)
345	12314	G.B. ...	... *Distilling Drinking Water from Sea Water (Contd.).* (Petroleum Times, Vol. 47, No. 1,199, 10/7/43, pp. 340-344.)
346	12328	U.S.A.	... *Increased Economy with Fuel and Tyre Rationing.* (E. O. Wirth and A. H. Winkler, J.S.A.E., Vol. 51, No. 6, June, 1943, pp. 220-228.)
			THEORY OF ELASTICITY.
			Stresses.
347	11424	Germany	... *Determination of Stress Distribution by Extensometer Measurement.* (D. Rotscher, Symposium of Papers on the Elements of Machine Design (Aachen), 1935, pp. 3-8.)
350	11811	U.S.A.	... *Code for Working Stresses—Pt. II.* (By J. Martin, The Engineer's Digest, Vol. 4, No. 2, Feb., 1943, pp. 35-38.)
351	11912	U.S.A.	... *An Investigation of the Behaviour of Residual Stresses Under External Load and their Effect on Safety.* (J. T. Norton and D. Rosenthal, Welding Literature, Vol. 5, No. 2, May, 1943, p. 98.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
352	12054	U.S.A.	... *On the Transition from a Ductile to a Brittle Type of Fracture in Several Low Alloy Steels.* (*Preprint No.* 39.) (P. G. Jones, A.S.T.M., 1943 Preprints, June 28-July 2, 1943.)
353	12056	U.S.A.	... *Hyperbolic Sine Chart for Estimating Working Stresses of Alloys at Elevated Temperatures.* (*Preprint No.* 42.) (A. Nadai and P. G. McVetty, A.S.T.M., 1943 Preprints, June 28-July 2, 1943.)
354	12193	U.S.A.	... *Impact Testing of Plastics—1. Energy Considerations.* (*Preprint No.* 88.) (D. Telfair and H. K. Nason, A.S.T.M., 1943 Preprints, June 28-July 2, 1943.)
			Fatigue Testing.
355	12039	U.S.A.	... *Second Progress Report on the Effect of Size of Specimens on Fatigue Strength of Three Types of Steel.* (*Preprint No.* 24.) (H. F. Moore and D. Morkovin, A.S.T.M., 1943 Preprints, June 28-July 2, 1943.)
356	12057	U.S.A.	... *The Effect of Overstressing and Understressing in Fatigue.* (*Preprint No.* 43.) (J. B. Kommers, A.S.T.M., 1943 Preprints, June 28-July 2, 1943.)
357	12058	U.S.A.	... *The Fatigue Properties of Some Cold Drawn Nickel Alloy Wires.* (*Preprint No.* 44.) (J. N. Kenyon, A.S.T.M., 1943 Preprints, June 28-July 2, 1943.)
358	12059	U.S.A.	... *Fatigue Tests on Some Copper Alloys in Wire Form.* (*Preprint No.* 45.) (A.S.T.M., 1943 Preprints, June 28-July 2, 1943.)
359	12194	U.S.A.	... *The Relation Between Results of Repeated Blow Impact Tests and of Fatigue Tests.* (*Preprint No.* 89.) (W. N. Findley and O. E. Hintz, Jr., A.S.T.M., 1943 Preprints, June 28-July 2, 1943.)
			Plates (Compressive Properties).
360	11522	U.S.A.	... *Perforated Cover Plates for Steel Columns: Compressive Properties of Plates having Circular Perforations and a Width to Thickness Ratio of 53 (Contd.).* (A. H. Stang and M. Greenspan, J. Res. Bur. Stands., Vol 30, No. 3, March, 1943, p. 177.)
361	11602	U.S.A.	... *Perforated Cover Plates for Steel Columns: Compressive Properties of Plates having Ovaloid Perforations and a Width-to-Thickness Ratio of 53.* (A. H. Stang and M. Greenspan, J. Res. Nat. Bur. Stands., Vol. 30, No. 1, Jan., 1943, pp. 13-39.)
			Creep Tests.
364	11706	U.S.A.	... *Creep of Metals at Elevated Temperatures—The Hyperbolic Sine Relation Between Stress and Creep Rate.* (P. S. McNatty, A.S.M.E. Preprint, April 26-28, 1943.)
365	11799	U.S.A.	... *100,000-Hour Creep Test.* (By E. L. Robinson, Mechanical Engineering, Vol. 65, No. 3, March, 1943, pp. 166-168.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
			Strength Characteristics of Certain Materials.
366	11659	U.S.A. ...	*The Elasticity of Synthetic Rubbers at Low Temperatures (Elastometer Testing).* (G. W. Kisk, Aero Digest, Vol. 42, No. 5, May, 1943, pp. 245-246, 257, 339.)
367	11686	G.B.	*Strength of Glued Scarf Joint.* (Mech. World, Vol. 114, No. 2,949, 9/7/43, pp. 53-55.)
368	12055	U.S.A. ...	*The Technical Cohesive Strength and Mechanical Properties of Metals at Low Temperatures. (Preprint No. 40.)* (D. J. McAdam and R. W. Mebs, A.S.T.M., 1943 Preprints, June 28-July 2, 1943.)
			Box Beams (Testing).
373	11813	Germany ...	*Calculation of Box Type Frames Restricted Against Deformation.* (From Die Werkzeugmaschine, Vol. 46, No. 4, Feb., 1942, pp. 97-101.) (The Engineer's Digest, Vol. 4, No. 2, Feb., 1943, pp. 42-45.)
374	12014	U.S.A. ...	*Theoretical and Experimental Investigations of Thin Webbed Plate Girder Beams.* (H. L. Langhaar, Preprints of Papers Presented at the Los Angeles Meeting of the A.S.M.E., June 14-17, 1943.)
			MATERIALS (PROPERTIES, FABRICATION, INSPECTION).
			A. Properties.
			General Properties (Magnetic, etc.).
375	11061	U.S.A. ...	*Mechanical Properties of Cellulose Acetate as Related to Molecular Chain Length.* (A. M. Sookne and M. Harriss, J. of Res. Nat. Bur. Stands., Vol. 30, No. 1, Jan., 1943, pp. 1-14.)
376	11283	G.B.	*Controls of Raw Materials.* (Engineering, Vol. 155, No. 4,041, 25/6/43, pp. 511-512.)
377	11557	G.B.	*Significance of Mechanical Test Properties of Metals.* (Hugh O'Niel, Engineering, Vol. 156, No. 4,043, 9/7/43, pp. 38-40.)
378	11561	U.S.A. ...	*High Polymers. A Series of Monographs on the Chemistry, Physics and Technology of High Polymeric Substances. Vol. IV: Natural and Synthetic High Polymers (Book Review).* (K. H. Meyer, Res. Sci. Instrum., Vol. 14, No. 4, April, 1943, p. 107.)
379	11803	U.S.A. ...	*Principal Characteristics of the Important Textile Fibres.* (By Werner von Bergen, Mechanical Engineering, Vol. 65, No. 3, March, 1943, pp. 183-190.)
380	11847	G.B.	*Caustic Embrittlement.* (E. W. Colbeck and others, Metal Treatment, Vol. 9, No. 32, 1942-1943, pp. 171-176.)
381	12020	U.S.A. ...	*Annual Report of the Executive Committee. (Preprint No. 1.)* (A.S.T.M., 1943 Preprints, June 28-July 2, 1943.)
382	12023	U.S.A. ...	*Report of Committee E. 10 on Standards. (Preprint No. 5.)* (A.S.T.M., 1943 Preprints, June 28-July 2, 1943.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
383	12027	U.S.A. ...	*Report of Committee A. 6 on Magnetic Properties.* (*Preprint No. 9.*) (A.S.T.M., 1943 Preprints, June 28-July 2, 1943.)
384	12063	U.S.A. ...	*Report of Committee C. 8 on Refractories.* (*Preprint No. 53.*) (A.S.T.M., 1943 Preprints, June 28-July 2, 1943.)
385	12066	U.S.A. ...	*Report of Committee C. 16 on Thermal Insulating Materials.* (*Preprint No. 56.*) (A.S.T.M., 1943 Preprints, June 28-July 2, 1943.)
386	12079	U.S.A. ...	*Report of Committee D. 9 on Electrical Insulating Materials (Insulating Liquids, etc.).* (*Preprint No. 74.*) (A.S.T.M., 1943 Preprints, June 28-July 2, 1943.)
387	12080	U.S.A. ...	*Report of Sectional Committee on Electrical Insulating Materials.* (*Preprint No. 74a.*) (A.S.T.M., 1943 Preprints, June 28-July 2, 1943.)
388	12083	U.S.A. ...	*Report of Committee D. 13 on Textile Materials.* (*Preprint No. 77.*) (A.S.T.M., 1943 Preprints, June 28-July 2, 1943.)
389	12207	U.S.A. ...	*Cumulative Index, 1913-1942 (of Papers, Authors and Subjects).* (Proceedings of the I.R.E., Vol. 31, No. 6, Pt. 2, June, 1943.)
			Iron and Steel.
390	11261	U.S.A. ...	*Atomic Structure of Martensite.* (Metal Progress, Vol. 43, No. 5, May, 1943, p. 762.)
391	11553	G.B.	*Rapid Identification of Nickel Steel.* (Engineering, Vol. 156, No. 4,043, 9/7/43, p. 26.)
392	11556	Sweden ...	*Research on Fine-Grained Steel.* (Engineering, Vol. 156, No. 4,043, 9/7/43, p. 29.)
393	11685	Sweden ...	*Swedish Researches in Fine-Grained Steel.* (Mech. World, Vol. 114, No. 2,949, 9/7/43, p. 41.)
394	11842	G.B.	*Hardness of Steel.* (Metal Treatment, Vol. 9, No. 32, 1942-1943, pp. 155-158.)
395	11849	G.B.	*Special Steels and the Conservation of Alloys.* (Dr. W. H. Hatfield, Metal Treatment, Vol. 9, No. 32, 1942-1943, p. 181.)
396	11851	Germany ...	*Solubility of Steels in Lead and Lead Alloys.* (From Zeitschrift für Metalkunde, May, 1942.) (W. Timmerhoff, Metal Treatment, Vol. 9, No. 32, 1942-1943, pp. 187-188.)
397	11855	Germany ...	*Austenitic Manganese Valve Steels.* (H. Cornelius (from the German), Metal Treatment, Vol. 9, No. 32, 1942-1943, pp. 191-192, 198.)
398	11862	G.B.	*Manufacture of Ferrous Material from Ore (Study of Foreign Processes).* (Metal Treatment, Vol. 9, No. 32, 1942-1943, p. 201.)
399	12024	U.S.A. ...	*Report of Committee A. 1 on Steel.* (*Preprint No. 6.*) (A.S.T.M., 1943 Preprints, June 28-July 2, 1943.)
400	12025	U.S.A. ...	*Report of Committee A. 3 on Cast Iron.* (*Preprint No. 7.*) (A.S.T.M., 1943 Preprints, June 28-July 2, 1943.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
401	12029	U.S.A. ...	*Report of Committee A. 7 on Malleable Iron Castings.* (*Preprint No.* 10.) (A.S.T.M., 1943 preprints, June 28-July 2, 1943.)
402	12042	U.S.A. ...	*A Test for Measuring Drawability of Deep Drawing Steels.* (*Preprint No.* 26.) (F. H. Boulgen and F. B. Dahle, A.S.T.M., 1943 Preprints, June 28-July 2, 1943.)
403	12043	U.S.A. ...	*The Steam Ageing of Killed Low Carbon Steel, with Particular Reference to the Effect of Titanium.* (*Preprint No.* 27.) (G. F. Comstock, A.S.T.M., 1943 Preprints, June 28-July 2, 1943.)
404	12044	U.S.A. ...	*Structure and Creep Characteristics of Cast Carbon-Molybdenum Steel at 950°F.* (*Preprint No.* 28.) (H. E. Montgomery and J. Urban, A.S.T.M., 1943 Preprints, June 28-July 2, 1943.)
			Al. and Mg. Alloys.
405	11366	G.B.	*Extinguishing Magnesium Fires.* (Metal Industry, Vol. 63, No. 3, 16/7/43, p. 38.)
406	11414	G.B.	*Production of Multi-Coloured Effects on Anodised Aluminium.* (V. F. Henly, Metal Industry, Vol. 62, No. 25, 18/6/43, pp. 386-388.)
407	11423	G.B.	*Canadian Magnesium Production from Dolomite Deposits.* (Metal Industry, Vol. 62, No. 25, 18/6/43, p. 398.)
408	11513	G.B.	*Aluminium in Post-War Reconstruction—II.* (R. Hammond, Engineer, Vol. 176, No. 4,565, 9/7/43, pp. 33-35.)
409	11830	Germany ...	*Properties of Magnesium Alloys as Affecting Design and Fabrication.* (*R.T.P.3 Translation No.* 1,396.) (K. Renner, Sheet Metal Industry, Vol. 17, No. 192, April, 1942, pp. 651-657.)
410	11861	G.B.	*The Effect of Minor Alloying Elements in Aluminium Casting Alloys.* (Metal Treatment, Vol. 9, No. 32, 1942-1943, pp. 199-201.)
411	12035	U.S.A. ...	*Report of Committee B. 7 on Light Metals and Alloys, Cast and Wrought (Including Appendices on "A Comparison of the Performances of Anodic Coatings on Wrought Aluminium Alloys when Exposed to Salt Spray and to the Weather," and "Aluminium Sheet and Plate for Use in Welded Pressure Vessels").* (*Preprint No.* 18.) (A.S.T.M., 1943 Preprints, June 28-July 2, 1943.)
412	12040	U.S.A. ...	*Report of Joint Committee on Filler Metal (Aluminium and Aluminium-Alloy Metal Arc-Welding Electrodes).* (*Preprint No.* 24a.) (A.S.T.M., 1943 Preprints, June 28-July 2, 1943.)
413	12049	U.S.A. ...	*Experiments on Plastic Bending for Aluminium Alloy 17S-T.* (*Preprint No.* 34.) (J. Marin and S. D. Cotterman, A.S.T.M., 1943 Preprints, June 28-July 2, 1943.)
414	12217	G.B.	*Magnesium: Its Production and Use.* (E. V. Pannell, Engineering, Vol. 156, No. 4,046, July 30, 1943, p. 83.)

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				Non-Ferrous Metals.
415	11363	G.B.	... ...	*The Effect of Certain Impurities on Copper and Copper Alloys.* (G. L. Bailey, Metal Industry, Vol. 63, No. 3, 16/7/43, pp. 34-36.)
416	11367	G.B.	... ...	*Brasses as Substitutes for Gun Metal.* (Metal Industry, Vol. 63, No. 3, 16/7/43, pp. 39-40.)
417	11368	G.B.	... ...	*Economy in Copper.* (Metal Industry, Vol. 63, No. 3, 16/7/43, p. 40.)
418	11518	G.B.	... ...	*The Effects of Certain Impurities on Copper and Copper Alloys.* (G. L. Bailey, Metal Industry, Vol. 63, No. 2, 9/7/43, pp. 20-22.)
419	11525	U.S.A.	...	*Thermal Expansion of Titanium.* (P. Hidnert, J. Res. Bur. Stands., Vol. 30, No. 2, Feb., 1943, pp. 101-105.)
420	11684	G.B.	... ...	*Tin and Its Uses.* (*Issued by the Tin Research Institute.*) (Mech. World, Vol. 14, No. 2,949, 9/7/43, p. 41.)
421	11741	G.B.	... ...	*Abstracts Issued by the Zinc Development Association, July,* 1943.
422	11825	U.S.A.	...	*Army Tin Economies.* (Sheet Metal Industry, Vol. 17, No. 192, April, 1942, p. 627.)
423	11856	U.S.A.	...	*Production of Metallic Calcium in the U.S.A.* (A. B. Kinzel, Metal Treatment, Vol. 9, No. 32, 1942-1943, pp. 193-195.)
424	12028	U.S.A.	...	*Report of Committee B. 1 on Copper and Copper Alloy Wires for Electrical Conductors.* (*Preprint No.* 12.) (A.S.T.M., 1943 Preprints, June 28-July 2, 1943.)
425	12030	U.S.A.	...	*Report of Committee B. 2 on Non-Ferrous Metals and Alloys.* (*Preprint No.* 13.) (A.S.T.M., 1943 Preprints, June 28-July 2, 1943.)
426	12033	U.S.A.	...	*Report of Committee B. 5 on Copper and Copper Alloys, Cast and Wrought.* (*Preprint No.* 16.) (A.S.T.M., 1943 Preprints, June 28-July 2, 1943.)
427	12048	U.S.A.	...	*Lead Alloy Coated Copper Wire for Electrical Conductors.* (*Preprint No.* 33.) (C. J. Snyder, A.S.T.M., 1943 Preprints, June 28-July 2, 1943.)
428	12210	G.B.	... ...	*The Problem of Copper and Galvanised Iron in the Same Water System.* (L. Kenworthy, Engineering, Vol. 156, No. 4,046, July 30, 1943, pp. 85-86.)
429	12223	G.B.	... ...	*Cu-Sb-Ni Gear Alloy* (*I.B.F. Report*). (Metal Industry, Vol. 63, No. 6, 6/8/43, pp. 86-89.)
430	12344	U.S.A.	...	*The Uses of Iridium.* (Review of Scientific Instruments, Vol. 14, No. 6, June, 1943, pp. 191-192.)
431	12346	U.S.A.	...	*A New Brazing Alloy, Phos. Copper.* (Review of Scientific Instruments, Vol. 14, No. 6, June, 1943, p. 192.)
				Plastics and Resin.
432	11411	U.S.A.	...	*New Plastic Material for Making Dies, Jigs, etc.* (*Thermo-Cast*). (Ind. and Eng. Chem., Vol. 21, No. 8, 25/4/43, p. 561.)
433	11415	U.S.A.	...	*Plastic Hinges Replace Metal* ("*Tenite*"). (Ind. and Eng. Chem., Vol. 21, No. 8, 25/4/43, p. 580.)

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434	11533	G.B.	*Vinylidene Chloride Polymers.* (R. C. Reinhardt, British Plastics, Vol. 15, No. 170, July, 1943, pp. 68-78.)
435	11534	Canada ...	*Plastics are Essential Materials.* (J. H. Savage, British Plastics, Vol. 15, No. 170, July, 1943, pp. 80-81.)
436	11538	G.B.	*Acrylic Resins Toughen Leather.* (British Plastics, Vol. 15, No. 170, July, 1943, p. 91.)
437	11539	G.B.	*Julelite—an Indian Development.* (British Plastics, Vol. 15, No. 170, July, 1943, p. 91.)
438	11541	G.B.	*All Fibre Plastics-Lined Oil Container.* (British Plastics, Vol. 15, No. 170, July, 1943, p. 92.)
439	11542	G.B.	*Compasses of "Lucite."* (British Plastics, Vol. 15, No. 170, July, 1943, p. 92.)
440	11588	G.B.	*Metallizing Plastics (Contd.).* (E. E. Halls, Plastics, Vol. 7, No. 74, July, 1943, pp. 281-286.)
441	11591	Germany ...	*Influence of the Chemical Constitution of Plastics on Their Mechanical Properties.* (From Kunstoffe Technik and Anwendung, Vol. 12, 1942, p. 215.) (K. H. Hawk, Plastics, Vol. 7, No. 74, July, 1943, p. 292.)
442	11739	G.B.	*Plastic Abstract No. 45, Issued by Controller of Chemical Research.*
443	12086	U.S.A. ...	*Report of Committee D. 20 on Plastics. (Preprint No. 81.)* (A.S.T.M., 1943 Preprints, June 28-July 2, 1943.)
444	12191	U.S.A. ...	*Deformation Under Load of Rigid Plastics. (Preprint No. 87.)* (R. Burns, A.S.T.M., 1943 Preprints, June 28-July 2, 1943.)
445	12206	G.B.	*The Practical Use of Plastics in Building and Constructional Work.* (F. S. Snow and others, Chemistry and Industry, Vol. 62, No. 31, July 31, 1943, pp. 287-290.)
446	12212	G.B.	*Hot-Air Ducts of Non-Metallic Material.* (Engineering, Vol. 156, No. 4,046, July 30, 1943, pp. 87-88.)
			Rubber (Nat. and Syn.).
447	11412	U.S.A. ...	*Synthetic Rubber Linings for Concrete Fuel Storage Tanks (Thicol F.A.).* (Ind. and Eng. Chem., Vol. 21, No. 8, 25/4/43, pp. 580-583.)
448	11801	U.S.A. ...	*War Rubber Problem of the U.S.A.* (By A. V. Karpov, Mechanical Engineering, Vol. 65, No. 3, March, 1943, pp. 179-181, 207.)
449	12081	U.S.A. ...	*Report of Committee D. 11 on Rubber Products. (Method of Test for Low Temperature Brittleness of Rubber and Rubber-like Materials; Testing Compressed Asbestos Sheet Packing; Specifications for Insulated Wire and Cable; Polyvinyl Insulating Compound; Specifications for Rubber and Synthetic Rubber Compounds for Automotive and Aeronautical Applications.) (Preprint No. 75.)* (A.S.T.M., 1943 Preprints, June 28-July 2, 1943.)

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450	12192	U.S.A. ...	*Relaxation of Rubber-like Materials.* (*Preprint No. 87a.*) (I. L. Hopkins, A.S.T.M., 1943 Preprints, June 28-July 2, 1943.)
451	12203	U.S.A. ...	*Paracon (Polyester Rubber).* (B. S. Briggs and C. S. Fuller, Ind. Eng. and Chem. (News Edition), Vol. 21, No. 12, 25/6/43, pp. 962-963.)
452	12305	U.S.A. ...	*Experiments in Growing Russian Rubber Producing Dandelion.* (National Petroleum News, Vol. 35, No. 21, 26/5/43, p. 7.)
453	12309	U.S.A. ...	*Production of Synthetic Rubber, New Alky-Rubber Plant.* (National Petroleum News, Vol. 35, No. 22, 2/6/43, pp. 18-20.)
454	12310	U.S.A. ...	*Synthetic Rubber Discussed by Chemurgic Conference.* (National Petroleum News, Vol. 35, No. 13, 31/3/43, p. 19.)
455	12343	U.S.A. ...	*Use of Synthetic Rubber (Ameripol for Anti-Vibration Mountings).* (Review of Scientific Instruments, Vol. 14, No. 6, June, 1943, p. 191.)
			Wood, Plywood, Paper.
456	11630	U.S.A. ...	*Plywood Bonding—Data Sheet.* (Aviation, Vol. 42, No. 5, May, 1943, pp. 209-211.)
457	11662	U.S.A. ...	*Official Plywood and Veneer Specifications.* (R. C. Perkins, Aero Digest, Vol. 42, No. 5, May, 1943, pp. 273-284.)
458	11802	U.S.A. ...	*Wood—Raw Material of the Future.* (By N. C. Brown, Mechanical Engineering, Vol. 65, No. 3, March, 1943, pp. 182, 196.)
459	11931	Canada ...	*Plywoods and Plastics—Part II.* (C. A. Carter, Commercial Aviation, Vol. 5, No. 2, Feb., 1943, pp. 186-190.)
460	12077	U.S.A. ...	*Report of Committee on Paper and Paper Products. (Preprint No. 72.)* (A.S.T.M., 1943 Preprints, June 28-July 2, 1943.)
461	12269	Germany ...	*New German Material—Processed Wood ("Pressband").* (Flight, Vol. 44, No. 1,804, 22/7/43, p. 98.)
462	12271	G.B.	*Plywood and Plastics—I.* (W. Nichols, Flight, Vol. 44, No. 1,804, 22/7/43, pp. 99-102.)
			Glass, Plexiglass.
463	11360	G.B.	*Glass Gauges for Routine Inspection.* (Machinery, Vol. 63, No. 1,604, 3/7/43, pp. 42-44.)
464	11384	U.S.A. ...	*Strength Properties of Plexiglass—II.* (W. F. Baritoe, Aviation, Vol. 42, No. 3, March, 1943, pp. 140-149 and 359.)
465	12065	U.S.A. ...	*Report of Committee C. 14 on Glass and Glass Products. (Preprint No. 55.)* (A.S.T.M., 1943 Preprints, June 28-July 2, 1943.)
466	12201	G.B.	*Cutting Wide Bore Glass Tubing (Heat Generated by Looped String followed by Quenching in Water).* (A. G. Lipscomb, Chemistry and Industry, Vol. 62, No. 32, 7/8/43, p. 303.)
			Silver.
467	11846	G.B.	*Silver as a Substitute in Engineering.* (Metal Treatment, Vol. 9, No. 32, 1942-1943, p. 170.)

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468	11864	G.B. ...	... *Silver for Bearings.* (Metal Treatment, Vol. 9, No. 32, 1942-1943, p. 204.)
			Cements, Mortars, Concrete.
469	11523	U.S.A.	... *Some Properties of Heat-Setting Refractory Mortars.* (R. A. Heindl and William L. Pendergast, J. Res. Bur. Stands., Vol. 30, No. 2, April, 1943, pp. 303-310.)
470	12060	U.S.A.	... *Report of Committee C. 1 on Cement (Including Notes on the "Effect of Alkalies in Portland Cement on the Durability of Concrete").* (*Preprint No.* 50.) (A.S.T.M., 1943 Preprints, June 28-July 2, 1943.)
471	12062	U.S.A.	... *Report of Committee C. 7 on Lime.* (*Preprint No.* 52.) (A.S.T.M., 1943 Preprints, June 28-July 2, 1943.)
472	12064	U.S.A.	... *Report of Committee C. 9 on Concrete and Concrete Aggregates.* (*Preprint No.* 54.) (A.S.T.M., 1943 Preprints, June 28-July 2, 1943.)
473	12068	U.S.A.	... *Increasing the Reflectivity of Standard Portland Cement Concretes by Additions of Hydrated Lime.* (*Preprint No.* 58.) (C. W. Muhlenbruch and B. Marcin, A.S.T.M., 1943 Preprints, June 28-July 2, 1943.)
474	12069	U.S.A.	... *A Study of the Heat of Solution Procedure for Determining the Heat of Hydration of Portland Cement.* (*Preprint No.* 60.) (L. Shartsis and E. S. Newman, A.S.T.M., 1943 Preprints, June 28-July 2, 1943.)
475	12070	U.S.A.	... *A New Aspect of Creep in Concrete and its Application to Design.* (*Preprint No.* 64.) (D. McHendry, A.S.T.M., 1943 Preprints, June 28-July 2, 1943.)
476	12074	U.S.A.	... *Report of Committee D. 4 on Road and Paving Materials.* (*Preprint No.* 70.) (A.S.T.M., 1943 Preprints, June 28-July 2, 1943.)
477	12075	U.S.A.	... *Report of Sectional Committee on Road and Paving Materials.* (*Preprint* 70a.) (A.S.T.M., 1943 Preprints, June 28-July 2, 1943.)
			Bituminous Substances.
478	12078	U.S.A.	... *Report of Committee D. 8 on Bituminous Waterproofing and Roofing Materials.* (*Preprint No.* 73.) (A.S.T.M., 1943 Preprints, June 28-July 2, 1943.)
479	12987	U.S.A.	... *A Method for Evaluating Performance in Service of Slow-Curing Asphalts.* (*Preprint No.* 83.) (J. Zapata, A.S.T.M., 1943 Preprints, June 28-July 2, 1943.)
480	12088	U.S.A.	... *Accelerated Weathering of Bituminous Materials—Effect of Operating Variables.* (*Preprint No.* 84.) (B. Weetman, A.S.T.M., 1943 Preprints, June 28-July 2, 1943.)
481	12089	U.S.A.	... *A Method for the Testing and Evaluation of Road Tars.* (*Preprint No.* 85.) (E. O. Rhodes and H. E. Gillander, A.S.T.M., 1943 Preprints, June 28-July 2, 1943.)

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				B. Fabrication.	500
				Arc, Spot and Flash Welding.	
482	11512	G.B.	...	*Fractures in Welded Ships.* (J. Tutin, Engineer, Vol. 176, No. 4,565, 9/7/43, pp. 28-29.)	501
483	11546	G.B.	...	*Fractures in Welded Ships.* (H. B. Fergusson, Engineer, Vol. 176, No. 4,566, 16/7/43, p. 52.)	
484	11680	G.B.	...	*Preventing Wastage of Welding Electrode Stubs.* (Mech. World, Vol. 114, No. 2,949, 9/7/43, pp. 33-34.)	502
485	11681	G.B.	...	*Welding Light Metal Sheets.* (Mech. World, Vol. 114, No. 2,949, 9/7/43, p. 34.)	503
486	11835	G.B.	...	*Steel Framed Houses Using the Arc Welding Process.* (Boris Osman, Sheet Metal Industry, Vol. 17, No. 192, April, 1942, pp. 681-690.)	504
487	11837	G.B.	...	*Arc Welding of Magnesium Alloys (Contd.).* (W. S. Loose and A. R. Orban, Sheet Metal Industry, Vol. 17, No. 192, April, 1942, pp. 693-696.)	505
488	11845	G.B.	...	*Increasing the Speed of Arc Welding.* (Metal Treatment, Vol. 9, No. 32, 1942-1943, pp. 167-170.)	506
489	11904	U.S.A.	...	*Physics of the Arc and the Transfer of Metal in Arc Welding: A Review of the Literature to February, 1942.* (W. Spearagen and B. A. Lengyel, Welding Literature, Vol. 5, No. 2, May, 1943, p. 85.)	507 508
490	11905	G.B.	...	*Unionmelt Welding.* (R. R. Sillifant, Welding Literature, Vol. 5, No. 2, May, 1943, p. 87.)	509
491	11906	U.S.A.	...	*Welding Given Tremendous Impetus by War.* (F. J. Oliver, Welding Literature, Vol. 5, No. 2, May, 1943, p. 88.)	
492	11907	U.S.A.	...	*Arc Welding of Magnesium Alloys.* (W. S. Loose and A. R. Orban, Welding Literature, Vol. 5, No. 2, May, 1943, pp. 90-91.)	510
493	11908	G.B.	...	*Under-Water Arc Welding.* (A. J. Hipperson, Welding Literature, Vol. 5, No. 2, May, 1943, p. 93.)	511 512
494	11911	U.S.A.	...	*High Speed Tube Welding.* (G. V. Slottman, Welding Literature, Vol. 5, No. 2, May, 1943, pp. 97-98.)	513
495	11913	U.S.A.	...	*Unusual Resistance Welding Developments and Operations.* (R. T. Gillette, Welding Literature, Vol. 5, No. 2, May, 1943, p. 99.)	514
496	11914	U.S.A.	...	*Refrigerant-Cooled Spot-Welding Electrodes.* (F. R. Hensel, E. I. Larsen, E. F. Holt, Welding Literature, Vol. 5, No. 2, May, 1943, pp. pp. 101-102.)	515
497	11915	G.B.	...	*Flash Welding.* (L. A. Ferney, Welding Literature, Vol. 5, No. 2, May, 1943, pp. 103-104.)	
498	11916	G.B.	...	*Spot Welding Kink.* (D. Holden, Welding Literature, Vol. 5, No. 2, May, 1943, p. 105.)	516
499	11921	Germany	...	*Welding of Aluminium.* (Herrmann, Welding Literature, Vol. 5, No. 2, May, 1943, pp. 119-120.)	517

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500	12009	G.B.	... ...	*Welding of Cast Iron.* (Nature, Vol. 152, No. 3,844, 3/7/43, p. 25.)
501	12200	G.B.	... ...	*Special Applications of Welding.* (C. W. Brett, Chemistry and Industry, Vol. 62, No. 32, 7/8/43, p. 301.)
				Heat Treatment and Foundries.
502	11365	G.B.	... ...	*Correlation of Foundry Practice and Quality (Discussion).* (H. G. Warrington, Metal Industry, Vol. 63, No. 3, 16/7/43, pp. 37-38.)
503	11555	G.B.	... ...	*Heat Treatment of Wrought Aluminium Alloys.* (Engineering, Vol. 156, No. 4,043, 9/7/43, pp. 27-28.)
504	11708	U.S.A.	...	*Performance Characteristics of a Downdraft Coking Furnace.* (J. R. Fellows, A.S.M.E. Preprint, April 26-28, 1943.)
505	11819	Germany	...	*Carborundum in Foundry Practice.* (By Chr. Bruchhausen, from Die Giesserei, Vol. 29, No. 12, 1942, pp. 208-211.) (Engineer's Digest, Vol. 4, No. 2, Feb., 1943, pp. 55-57.)
506	11844	G.B.	... ...	*Infra-Red Heating.* (E. E. Halls, Metal Treatment, Vol. 9, No. 32, 1942-1943, pp. 159-166.)
507	11860	G.B.	... ...	*Plaster Patterns for the Foundry.* (Metal Treatment, Vol. 9, No. 32, 1942-1943, pp. 197-198.)
508	12022	U.S.A.	...	*Proposed Standard Definitions of Terms Relating to Heat Treatment of Metals. (Preprint No. 3.)* (A.S.T.M., 1943 Preprints, June 28-July 2, 1943.)
509	12032	U.S.A.	...	*Report of Committee B. 4 on Electrical Heating, Electrical Resistance and Electric Furnace Alloys. (Preprint No. 15.)* (A.S.T.M., 1943 Preprints, June 28-July 2, 1943.)
510	12215	G.B.	... ...	*Foundry Practice and Quantity in Light Alloy Castings.* (H. G. Warrington, Engineering, Vol. 156, No. 4,046, July 30, 1943, pp. 97-100.)
511	12222	G.B.	... ...	*Induction Melting of Aluminium.* (Metal Industry, Vol. 63, No. 6, 6/8/43, p. 85.)
512	12232	G.B.	... ...	*Furnace Brazing in a Controlled Atmosphere.* (Prod. and Eng. Bull., Vol. 2, No. 7, May, 1943, pp. 291-296.)
513	12239	G.B.	... ...	*Nitriding Furnaces.* (Automobile Engineer, Vol. 33, No. 438, July, 1943, pp. 277-282.)
				Casting.
514	10695	G.B.	... ...	*Pressure Castings—I.* (F. Dunleary, Foundry Trade J., 18/3/43, pp. 217-221.) (Met. Vick. Tech. Bull., No. 859, 26/3/43, p. 1.)
515	11285	G.B.	... ...	*Correlation of Foundry Practice and Quality as Applied to Light Alloy Castings.* (H. G. Warrington, Metal Industry, Vol. 63, No. 1, July 2, 1943, pp. 3-5.)
516	11293	G.B.	... ...	*Producing Magnesium Castings.* (E. Bremer, Metal Industry, Vol. 62, No. 26, 25/6/43, pp. 404-405.)
517	11364	G.B.	... ...	*Barrel Cleaning of Castings.* (Metal Industry, Vol. 63, No. 3, 16/7/43, p. 36.)

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518	11509	G.B.	*Improved Method of Marking Reference Numbers on Castings.* (J. of the Inst. of Prod. Engrs., Vol. 22, No. 6, June, 1943, pp. 30-31.)
519	11519	G.B.	*Correlation of Foundry Practice and Quality as Applied to Light Alloy Castings (Contd.).* (H. G. Warrington, Metal Industry, Vol. 30, No. 2, 9/7/43, pp. 23-25.)
520	11537	G.B.	*Salvage of Porous Castings by Means of Plastics.* (British Plastics, Vol. 15, No. 170, July, 1943, p. 86.)
521	11598	G.B.	*Sealing Porous Castings.* (Plastics, Vol. 7, No. 74, July, 1943, pp. 303-305.)
522	11857	U.S.A. ...	*Centrifugally Cast Guns.* (Metal Treatment, Vol. 9, No. 32, 1942-1943, p. 196.)
523	12034	U.S.A. ...	*Report of Committee B. 6 on Die-Cast Metals and Alloys. (Preprint No. 17.)* (A.S.T.M., 1943 Preprints, June 28-July 2, 1943.)
524	12345	U.S.A. ...	*Better Iron Castings (Mechanite Process).* (Review of Scientific Instruments, Vol. 14, No. 6, June, 1943, p. 192.)
			Surface Protection.
525	11536	G.B.	*Methyl Methacrylate for Chrome Plating.* (British Plastics, Vol. 15, No. 170, July, 1943, p. 84.)
526	11552	G.B.	*Electroplated Coatings and the Salt Spray Test.* (Engineering, Vol. 156, No. 4,043, 9/7/43, p. 23.)
527	11833	G.B.	*New Uses for Vermiculite (Enamel).* (Sheet Metal Industry, Vol. 17, No. 192, April, 1942, pp. 672-673.)
528	11834	G.B.	*Weather Resistance of Porcelain Enamelled Iron Structural Units.* (W. N. Harrison and Dwight G. Moore, Sheet Metal Industry, Vol. 17, No. 192, April, 1942, pp. 677-679.)
529	11848	Germany ...	*Bonderised and Lacquered Steel Sheet (German Developments).* (Metal Treatment, Vol. 9, No. 32, 1942-1943, pp. 177-180.)
530	12036	U.S.A. ...	*Report of Committee B. 8 on Electro Deposited Metallic Coatings. (Preprint No. 19.)* (A.S.T.M., 1943 Preprints, June 28-July 2, 1943.)
531	12046	U.S.A. ...	*Properties of Plated Lead Coatings on Steel. (Preprint No. 30.)* (G. Soderberg, A.S.T.M., 1943 Preprints, June 28-July 2, 1943.)
532	12047	U.S.A. ...	*Use and Misuse of the Salt Spray Test as Applied to Electro Deposited Metallic Finishes. (Preprint No. 32.)* (C. H. Sample, A.S.T.M., 1943 Preprints, June 28-July 2, 1943.)
533	12071	U.S.A. ...	*Report of Committee D. 1 on Paint, Varnish, Lacquer and Related Products. (Preprint No. 67.)* (A.S.T.M., 1943 Preprints, June 28-July 2, 1943.)
534	12205	G.B.	*Exposure Behaviour and Colour Matching Problems with Bitumen Emulsion Camouflage Paint.* (J. A. Rawlinson and L. G. Gabriel, Journal of the Society of Chem. Ind., Vol. 62, No. 7, July, 1943, pp. 111-112.)

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535	12226	G.B. ...	... *Thickness Testing of Electro Deposits.* (Metal Industry, Vol. 63, No. 6, 6/8/43, pp. 90-92.)
536	12321	G.B. ...	... *Protective Chemical and Surface Finishes for Scientific Instruments and Apparatus.* (H. Sutton, Journal of Scientific Instruments, Vol. 20, No. 6, June, 1943, pp. 86-92.)
537	12322	G.B. ...	... *The Anodic Oxidation of Aluminium and Aluminium Alloys.* (E. Bovey, Journal of Scientific Instruments, Vol. 20, No. 6, June, 1943, pp. 92-97.)
538	12323	G.B. ...	... *Protective Paints and Varnishes for Scientific Instruments and Apparatus.* (W. E. Wornum, Journal of Scientific Instruments, Vol. 20, No. 6, June, 1943, pp. 98-102.)
			Soldering and Bonding.
539	11608	U.S.A.	... *Bonding Koroseal to Steel.* (Ind. and Eng. Chem. (News Ed.), Vol. 21, No. 10, 25/5/43, p. 764.)
540	11919	Germany	... *Hard Soldering Under Protective Gas.* (F. Pawlek, Welding Literature, Vol. 5, No. 2, May, 1943, p. 108.)
541	12050	U.S.A.	... *Conservation of Tin in Soft Solders.* (*Preprint No.* 35.) (D. L. Colwell and W. C. Lang, A.S.T.M., 1943 Preprints, June 28-July 2, 1943.)
542	12051	U.S.A.	... *The Testing and Properties of Non-Tin Solders Listed in Recent Federal Specifications.* (*Preprint No.* 36.) (J. A. Kies and W. F. Roeser, A.S.T.M., 1943 Preprints, June 28-July 2, 1943.)
543	12067	U.S.A.	... *Measurement of Bond Between Bricks and Mortar.* (*Preprint No.* 57.) (J. C. Pearson, A.S.T.M., 1943 Preprints, June 28-July 2, 1943.)
			Rolling, Cutting, Drilling.
544	11009	U.S.A.	... *The Importance of Cutting Fluids.* (J. Geschelin, Metal Progress, Vol. 43, No. 4, April, 1943, p. 548.)
545	11362	G.B. ...	... *Drilling Work on Hardening Metals.* (Machinery, Vol. 63, No. 1,604, 8/7/43, p. 48.)
546	11822	Germany	... *Cold and Hot Rolling of Metals.* (O. Emicko and K. H. Lucas (R.T.P.3 Translation No. 1,735), Sheet Metal Industries, Vol. 17, No. 192, April, 1942, p. 611.)
547	11852	G.B. ...	... *Rod Rolling Speeds.* (Metal Treatment, Vol. 9, No. 32, 1942-1943, p. 188.)
548	11863	G.B. ...	... *Cutting by Abrasive Wheels.* (Metal Treatment, Vol. 9, No. 32, 1942-1943, pp. 202-204.)
			Powder Metallurgy.
549	11786	U.S.A.	... *Powder Metallurgy.* (By Lieut.-Col. J. W. Frye, Army Ordnance, Vol. 24, No. 138, May-June, 1943, p. 499.)
550	11818	G.B. ...	... *Powder Metallurgy—Pt. II.* (Engineer's Digest, Vol. 4, No. 2, Feb., 1943, pp. 53-55.)
			Polishing, Machining.
551	11506	G.B. ...	... *Machining Efficiency of Lead Bearing Steels.* (J. of the Inst. of Prod. Engs., Vol. 22, No. 6, June, 1943, pp. 211-229.)

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552	11815	Germany ...	*Effective Cooling for Machining.* (By H. Zeder, from Meschinentau (Der Betrut), Vol. 24, No. 5, May, 1942, pp. 203-206.) (Engineer's Digest, Vol. 4, No. 2, Feb., 1943, pp. 46-48.)
553	11853	G.B.	*Electro Polishing of Micro Sections.* (Metal Treatment, Vol. 9, No. 32, 1942-1943, pp. 189-190.)
			Extrusion.
554	11585	U.S.A. ...	*Extruded Plastic Tubing* (" *Tulox* "). (Rev. of Sci. Instrum., Vol. 14, No. 5, May, 1943, pp. 154-155.)
555	11609	U.S.A. ...	*Plastic Tubing.* (Ind. and Eng. Chem. (News Ed.), 25/5/43, p. 765.)
556	12225	G.B.	*Control of Press Speed in Extrusion.* (Metal Industry, Vol. 63, No. 6, 6/8/43, p. 89.)
			Machines and Tools.
557	10878	G.B.	*New Super Hard Rivet* (" *H1 Shear* "). (Aeronautics, Vol. 8, No. 4, May, 1942, p. 42.)
558	10295	U.S.A. ...	*The Longhorn Tin Smelter.* (Metal Industry, Vol. 62, No. 26, 25/6/43, p. 406.)
559	11358	G.B.	*Reconditioning Milling Cutters.* (Machinery, Vol. 63, No. 1,604, 8/7/43, p. 33.)
560	11361	G.B.	*New "Hot Press Method" of Making Carbide Tools.* (Machinery, Vol. 63, No. 1,604, 8/7/43, p. 46.)
561	11376	G.B.	*An Adaptable Drill Jig (Speejig).* (Airc. Eng., Vol. 15, No. 172, June, 1943, p. 183.)
562	11515	G.B.	*New Super Finishing Machine.* (Engineer, Vol. 176, No. 4,565, 9/7/43, p. 38.)
563	11520	G.B.	*Automatic Plating Control Flexibility of the Cuprous Oxide Rectifier.* (G. E. Huenerfauth, Metal Industry, Vol. 30, No. 2, 9/7/43, pp. 23-25.)
564	11532	G.B.	*The Development of Carbide-Tipped Tools.* (Airc. Eng., Vol. 15, No. 173, July, 1943, p. 214.)
565	11826	G.B.	*Vibration of Presses.* (Sheet Metal Industry, Vol. 17, No. 192, April, 1942, p. 629.)
566	11859	G.B.	*Wire Enamelling Equipment.* (Metal Treatment, Vol. 9, No. 32, 1942-1943, p. 197.)
567	11909	U.S.A. ...	*Worn High Speed Tools Tipped with Carbide.* (J. S. Gillespie, Welding Literature, Vol. 5, No. 2, May, 1943, p. 94.)
568	12233	G.B.	*Horizontal Boring Machines.* (Prod. and Eng. Bull., Vol. 2, No. 7, May, 1943, pp. 299-301.)
569	12236	G.B.	*Precision Grinders.* (Automobile Engineer, Vol. 33, No. 438, July, 1943, pp. 267-272.)
			C. Inspection.
			General Analysis and Testing.
570	10779	U.S.A. ...	*Predicting Hardenability—Calculation of Joining End-Quench Curve from Analysis.* (J. Field, Metal Progress, Vol. 43, No. 3, March, 1943, pp. 402-405.)
571	10827	U.S.A. ...	*Single Crystal Research for Better Magnetic Materials.* (Sci. Am., Vol. 168, No. 2, Feb., 1943, p. 60.)

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572	11524	U.S.A.	...	*Analytical Separations by Means of Controlled Hydrolytic Precipitation.* (R. Gilchrist, J. Res. Bur. Stands., Vol. 30, No. 2, Feb., 1943, pp. 89-99.)
573	11603	U.S.A.	...	*An Improved Electrode Holder for Spectrographic Analysis.* (B. F. Scribner and C. H. Carliss, J. Res. Bur. Stands., Vol. 30, No. 1, Jan., 1943, pp. 41-45.)
574	11828	G.B. ...	...	*The Mercury Cracking Test for Brass Articles.* (R. G. Johnston, Sheet Metal Industry, Vol. 17, No. 192, April, 1942, pp. 645-647.)
575	11843	G.B. ...	...	*Electrolytic Isolation of Iron Carbide.* (Metal Treatment, Vol. 9, No. 32, 1942-1943, p. 158.)
576	11850	Germany	...	*Spot Reactions in Steel Analysis.* (G. Thanheiser and M. Waterkamp (from Archiv für das Eisen-Lüttenwesen), Metal Treatment, Vol. 9, No. 32, 1942-1943, p. 186.)
577	11854	G.B. ...	...	*A Rapid Electrolytic Non-Destructive Test for the Detection of Carbide Precipitation in 18-8 Steels (Abstract).* (H. W. Russell and others, Metal Treatment, Vol. 9, No. 32, 1942-1943, p. 190.)
578	11918	U.S.A.	...	*Correlation of Metallographic and Radiographic Examination of Spot Welds in Aluminium Alloys.* (D. W. Smith and F. Keller, Welding Literature, Vol. 5, No. 2, May, 1943, p. 107.)
579	12008	G.B. ...	...	*New X-Ray Evidence of the Nature of the Structural Changes in Cold-Worked Metals.* (H. Lipson and A. R. Stokes, Nature, Vol. 152, No. 3,844, 3/7/43, pp. 20-21.)
580	12010	G.B. ...	...	*New X-Ray Evidence on the Nature of the Structural Changes in Cold-Worked Metals.* (W. A. Wood, Nature, Vol. 151, No. 3,838, 22/5/43, p. 585.)
581	12021	U.S.A.	...	*Report of Committee E-1 on Methods of Testing. (Preprint No. 2.)* (A.S.T.M., 1943 Preprints, June 28-July 2, 1943.)
582	12037	U.S.A.	...	*Report of Committee E. 3 on Chemical Analysis of Metals. (Preprint No. 21.)* (A.S.T.M., 1943 Preprints, June 28-July 2, 1943.)
583	12038	U.S.A.	...	*Report of Committee E. 4 on Metallography. (Preprint No. 22.)* (A.S.T.M., 1943 Preprints, June 28-July 2, 1943.)
584	12041	U.S.A.	...	*The Measurement of A.C. and D.C. Permeability on 28-CM Test Specimens (Flat Magnetic Materials). (Preprint No. 25.)* (J. P. Barton and G. W. Smith, A.S.T.M., 1943 Preprints, June 28-July 2, 1943.)
585	12061	U.S.A.	...	*Report of Committee C. 5 on Fire Tests of Materials and Construction (including Fire Tests of Window Assembly). (Preprint No. 51.)* (A.S.T.M., 1943 Preprints, June 28-July 2, 1943.)
586	12195	U.S.A.	...	*Field and Laboratory Determination of Dissolved Oxygen. (Preprint No. 90.)* (R. C. Adams and others, A.S.T.M., 1943 Preprints, June 28-July 2, 1943.)

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587	12238	G.B.	...	*Dynamic Testing.* (Automobile Engineer, Vol. 33, No. 438, July, 1943, p. 276.)
588	12342	U.S.A.	...	*Electrophoresis of Colloids Under Wartime Conditions.* (K. G. Stern, Review of Scientific Instruments, Vol. 14, No. 6, June, 1943, p. 187.)
				Hardness Testing.
589	11257	U.S.A.	...	*Computations of Hardenability—Effect of Undissolved Carbides.* (Metal Progress, Vol. 43, No. 5, May, 1943, pp. 745-746.)
590	11260	U.S.A.	...	*Avoiding Hardening Cracks.* (Metal Progress, Vol. 43, No. 5, May, 1943, p. 748.)
591	11812	Germany	...	*Scatter of Results of Hardness Testing.* (From Stahl und Eisen, Vol. 62, No. 16, April, 1942, pp. 321-328, by W. Hengemühle.) (The Engineer's Digest, Vol. 4, No. 2, Feb., 1943, pp. 38-42.)
				Corrosion Testing.
592	11858	U.S.A.	...	*Increasing Corrosion Resistance of 18-8 Stainless Steel.* (Metal Treatment, Vol. 9, No. 32, 1942-1943, p. 196.)
593	11920	Germany	...	*The Corrosion Resistance of Hard Soldered Joints in Pure Aluminium.* (R. Kottisch, Welding Literature, Vol. 5, No. 2, May, 1943, p. 110.)
594	12026	U.S.A.	...	*Report of Committee A. 5 on Corrosion of Iron and Steel and on Field Tests of Wire and Wire Products. (Preprint No. 8.)* (A.S.T.M., 1943 Preprints, June 28-July 2, 1943.)
595	12031	U.S.A.	...	*Report of Committee B. 3 on Corrosion of Non-Ferrous Metals and Alloys (Atmospheric Corrosion and Total Immersion Testing). (Preprint No. 14.)* (A.S.T.M., 1943 Preprints, June 28-July 2, 1943.)
596	12052	U.S.A.	...	*The Atmospheric Corrosion of Copper. (Preprint No. 37.)* (A. W. Tracey and others, A.S.T.M., 1943 Preprints, June 28-July 2, 1943.)
597	12053	U.S.A.	...	*The Total Immersion Corrosion Test. (Preprint No. 38.)* (W. A. Wesley, A.S.T.M., 1943 Preprints, June 28-July 2, 1943.)
				INSTRUMENTS.
				Aircraft.
598	11476	U.S.A.	...	*Vulta Flight Test Recorder.* (Inter. Avia., No. 867, 1/5/43, pp. 13-14.)
599	11634	U.S.A.	...	*Octant Collinator.* (Aviation, Vol. 42, No. 5, May, 1943, p. 239.)
600	11639	U.S.A.	...	*Master Tachometer Test Stand.* (Aviation, Vol. 42, No. 5, May, 1943, p. 243.)
601	11661	U.S.A.	...	*Airframe Stress Analysis Using the Electrical Strain Gauge.* (W. T. Thomson, Aero Digest, Vol. 42, No. 5, May, 1943, pp. 259, 261-263.)
602	11776	G.B.	...	*The Sperry School for Aircraft Instruments Maintenance (Sperry Bombsight, Sperry Gyropilot).* (Aeroplane, Vol. 65, No. 1,675, 2/7/43, pp. 26-27.)

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603	11898	G.B.	*An Instrument for Testing Pilot Fitness.* (C. E. Ferree and G. Rand, J. Aviation Med., 1939, Sept., Vol. 10, No. 3, pp. 114-128.) (Bulletin of War Medicine, Vol. 1, No. 4, March, 1941, pp. 264-265.)
			Electron Microscopes.
604	11369	G.B.	*A Scanning Electron Microscope.* (M. K. Zworykin and others, Metal Industry, Vol. 63, No. 3, 16/7/43, pp. 41-44.)
605	11370	G.B.	*Mounting Micro Specimens.* (Metal Industry, Vol. 63, No. 3, 16/7/43, p. 44.)
606	11521	G.B.	*The Electron Microscope.* (Metal Industry, Vol. 63, No. 2, 9/7/43, p. 28.)
			Flow Meters.
607	11583	U.S.A. ...	*New Flow Indicator.* (Rev. of Sci. Instrum., Vol. 14, No. 5, May, 1943, p. 152.)
608	11668	U.S.A. ...	*Remote Reading Fuel Flow Meter for Fuel Oil, etc.* (Aero Digest, Vol. 42, No. 5, May, 1943, p. 409.)
609	12338	U.S.A. ...	*An Apparatus for Measuring Air Flow During Inspiration.* (R. C. Lee and L. Silverman, Review of Scientific Instruments, Vol. 14, No. 6, June, 1943, pp. 174-181.)
610	12341	U.S.A. ...	*An Indicator for the Level of Liquids.* (A. D. Power, Review of Scientific Instruments, Vol. 14, No. 6, June, 1943, p. 188.)
			Temp. Recording.
611	11581	U.S.A. ...	*Experimental Details for a Precision High Temperature Control Unit Utilising the Hull Circuit.* (C. E. Waring and G. Robinson, Rev. of Sci. Instrum., Vol. 14, No. 5, May, 1943, pp. 143-146.)
612	12013	U.S.A. ...	*Automatic Temperature Recording Control System.* (M. E. Moore, Preprints of Papers Presented at the Los Angeles Meeting of the A.S.M.E., June 14-17, 1943.)
			Electrical.
613	11526	U.S.A. ...	*Miniature Geiger Muller Counter.* (L. F. Curtis, J. Res. Bur. Stands., Vol. 30, No. 2, Feb., 1943, pp. 157-158.)
614	11554	G.B.	*Insulation Stripping Machine for Electric Cables.* (Engineering, Vol. 156, No. 4,043, 9/7/43, p. 27.)
615	11582	U.S.A. ...	*A Fast Clock Switch for Automatic Control Circuits.* (N. L. Yeater, Rev. of Sci. Instrum., Vol. 14, No. 5, May, 1943, pp. 146-147.)
616	12224	G.B.	*Recording Dilatometers (Electrical Capacity Types).* (Metal Industry, Vol. 63, No. 6, 6/8/43, p. 89.)
617	12315	G.B.	*The Electrical Amplifying Stethoscope and Phono-Electrocardioscope (with Discussion).* (G. E. Donovan, J. Inst. Elect. Engs., Vol. 90, Pt. III, No. 10, June, 1943, pp. 38-52.)
618	12339	U.S.A. ...	*A Two-Cycle Flasher (a Light Valve for Providing Single Flashes of 3 m./sec. Duration or Longer).* (S. A. Talbot, Review of Scientific Instruments, Vol. 14, No. 6, June, 1943, pp. 181-184.)

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619	12340	U.S.A. ...	*A Synchronised Calibrator for Sweep and Gain in Cathode Ray Recording (for Oscillographic Study of Nerve Potentiates).* (S. A. Talbot, Review of Scientific Instruments, Vol. 14, No. 6, June, 1943, pp. 184-186.)
			Miscellaneous.
620	11418	G.B.	*Power Washing Machines.* (K. P. Bellinger, Metal Industry, Vol. 62, No. 25, 18/6/43, pp. 393-394.)
621	11517	G.B.	*Gauges for Sheet Metals and Wires.* (Metal Industry, Vol. 63, No. 2, 9/7/43, pp. 18-19.)
622	11558	U.S.A. ...	*Slotted Cylindrical Rotors for Photometric Calibration.* (J. R. Platt and others, the Review of Sci. Instrum., Vol. 14, No. 4, April, 1943, pp. 85-88.)
623	12334	Germany ...	*Determination of the Composition of Smokeless Powders by the Haig Manometric Test.* (M. Tonegutti and E. Brandimarte, Z.G.S.S., Vol. 38, No. 5, May, 1943, pp. 77-81.)
624	11560	U.S.A. ...	*Laboratory Liquid Air Storage.* (J. R. Roebuck, Rev. Sci. Instrum., Vol. 14, No. 4, April, 1943, pp. 90-97.)
625	12229	Germany ...	*The Determination of the Depth of Waterways by the Land Log (Accurate Location of Observer).* (O. Marxen, Schiff und Werft, Vol. 44-24, No. 11-12, June, 1943, pp. 193-195.)
			PRODUCTION.
			Organisation and Control.
626	11289	G.B.	*Conservation and Production of Essential Metals for War.* (Metal Industry, Vol. 63, No. 1, 2/7/43, pp. 10-11.)
627	11375	G.B.	*Sampling Inspection and Quality Determination.* (H. Rissik, Airc. Eng., Vol. 15, No. 172. June, 1943, pp. 179-182.)
628	11383	G.B.	*High Speed in the War Time Production Shop.* (G. Schlesinger, Preprint of Paper Presented to Inst. of Prod. Engs., April, 1943.)
629	11437	U.S.A. ...	*Aviation's Place in the Controlled Materials Plan.* (J. Foster, Aviation, Vol. 42, No. 4, April, 1943, pp. 114-115 and 378-389.)
630	11438	U.S.A. ...	*Absenteeism in the Aircraft Industry.* (Aviation, Vol. 42, No. 4, April, 1943, pp. 116-117 and 333-337.)
631	11439	U.S.A. ...	*20 Years of Consolidated Aircraft.* (Aviation, Vol. 42, No. 4, April, 1943, pp. 122-125 and 404.)
632	11455	U.S.A. ...	*Consolidated Sub-Contract System.* (H. G. Golem, Aviation, Vol. 42, No. 4, April, 1943, pp. 195-197 and 342-350.)
633	11514	G.B.	*Problems of Employment (Nuffield College Report).* (Engineer, Vol. 176, No. 4,565, 9/7/43, pp. 35-37.)
634	11620	U.S.A. ...	*Reduction of Man-Hours in Aircraft Production at Consolidated Vultee's Aircraft Plant.* (I. M. Laddon, Aviation, Vol. 42, No. 5, May, 1943, pp. 170-173 and 356-360.)

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635	11713	U.S.A. ...	*Operation of Industrial Power Plants Under War-time Conditions.* (G. H. Scibs, A.S.M.E. Pre-print, April 26-28, 1943.)
636	11771	G.B. ...	*Quantity Control at "Bristols."* (Aeroplane, Vol. 65, No. 1,675, 2/7/43, pp. 12-13.)
637	11791	U.S.A. ...	*Balanced Production for War.* (By H. Bruce, Army Ordnance, Vol. 24, No. 138, May-June, 1943, pp. 510-512.)
638	11797	U.S.A. ...	*Industry in the Post-War World.* (By A. W. S. Herrington, Army Ordnance, Vol. 24, No. 138, May-June, 1943, pp. 496-498.)
639	11798	U.S.A. ...	*Post-War Industrial Development.* (By G. A. Sloan, Mechanical Engineering, Vol. 65, No. 3, March, 1943, pp. 163-165.)
640	11823	G.B. ...	*Plant and Process Problems (Contd.) (Hardening of Steel, etc.).* (D. G. P. Paterson, B.Sc., A.I.C., Sheet Metal Industry, Vol. 17, No. 192, April, 1942, pp. 614-622.)
641	11832	G.B. ...	*Production Control.* (A. J. Milne, Sheet Metal Industry, Vol. 17, No. 192, April, 1942, pp. 669-671 and 673.)
642	12324	U.S.A. ...	*Economic Aspects of Standardization.* (B. C. Boulton, J.S.A.E., Vol. 51, No. 6, June, 1943, pp. 20-22, 44-47.)
			Research and Training.
643	10822	G.B. ...	*Library Information and Statistics.* (Engineering, Vol. 155, No. 4,031, 28/5/43, pp. 431-432.)
644	11140	G.B. ...	*Library Notes, Issued by the Library Research Division of I.C.I. (Explosives), Ltd.* (Vol. 23, No. 25, 24/6/43.)
645	11477	U.S.A. ...	*Institute of Aeronautical Science Awards.* (Inter. Avia., No. 867, 1/5/43, p. 15.)
646	11279	G.B. ...	*Sources of Information (Aslib Guide to Engineering, No. 5).* (Engineering, Vol. 155, No. 4,041, 25/6/43, p. 512.)
647	11548	G.B. ...	*Problems of Employment.* (Engineer, Vol. 176, No. 4,566, 16/7/43, pp. 56-58.)
648	11614	U.S.A. ...	*Science Abstracts—Section A.* (Issued by the Inst. Elect. Engs., Vol. 46, No. 546, June, 1943.)
649	11697	U.S.A. ...	*The Training Programmes of the Bureau of Training of the War Man Power Commission.* (P. S. Van Wyck, A.S.M.E. Preprint, April 26-28, 1943.)
650	11698	U.S.A. ...	*Practices and Policies of Vocational Training for War Production Members.* (L. S. Hawkins, A.S.M.E. Preprint, April 26-28, 1943.)
651	11711	U.S.A. ...	*C.A.A. War Training Programme in Colleges from a Teacher's Standpoint.* (E. C. Lundquist, A.S.M.E. Preprint, April 26-28, 1943.)
652	11712	U.S.A. ...	*The Services of T.W.I. (Training within Industry).* (A. E. Peterson, A.S.M.E. Preprint, April 26-28, 1943.)
653	11754	U.S.A. ...	*Lease Lend Report.* (Inter. Avia., No. 869-870, 18/5/43, pp. 18-19.)

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654	11804	U.S.A. ...	*Planned Conservation of Man Power.* (By F. K. Mitchell, Mechanical Engineering, Vol. 65, No. 3, March, 1943, pp. 191-196.)
655	11806	U.S.A. ...	*Engineering Education.* (By R. G. Freeman, Mechanical Engineering, Vol. 65, No. 3, March, 1943, pp. 202-204, 207.)
656	11807	U.S.A. ...	*The Organization of Textile Research for War.* (F. S. Blanchard, Mechanical Engineering, Vol. 65, No. 3, March, 1943, pp. 205-207).
657	11808	U.S.A. ...	*Women in Engineering.* (Mechanical Engineering, Vol. 65, No. 3, March, 1943, p. 210.)
658	12003	G.B.	*Co-operation in Scientific Research in the British Empire.* (Nature, Vol. 152, No. 3,845, 10/7/43, pp. 29-31.)
659	12218	G.B.	*Scientific Research (Extract from Lord Cherwell's Speech in the House of Lords).* (Engineer, Vol. 176, No. 4,569, 6/8/43, pp. 108-109, 110.)
660	12319	G.B.	*Education and Training for Engineers (Report submitted to I.E.E.).* (J. Inst. Elect. Engs., Vol. 90, Pt. I, No. 30, June, 1943, pp. 223-233.)
661	12353	G.B.	*Need for More Research in the British Aircraft Industry.* (Inter. Avia., No. 871, 26/5/43, pp. 12-13).
			Aircraft Production Methods.
662	11454	U.S.A. ...	*Aircraft Steel Tubing (Data Sheets of Specifications, etc.).* (Aviation, Vol. 42, No. 4, April, 1943, pp. 189-191.)
663	11442	U.S.A. ...	*Data on the Engineering and Production of Plastic Components for Aircraft—Part I.* (J. Sasso, Aviation, Vol. 42, No. 4, April, 1943, pp. 141-143 and 403.)
664	11642	G.B.	*Mosquito Design Facilitates Production.* (J. Montagnes, Aviation, Vol. 42, No. 5, May, 1943, pp. 259-261.)
665	11378	U.S.A. ...	*Producing the B-25 Bomber.* (R. E. Dawe, Aviation, Vol. 42, No. 3, March, 1943, pp. 106-111, 359-362.)
666	11379	U.S.A. ...	*Design and Production with Substitute Materials.* (S. R. Carpenter, Aviation, Vol. 51, No. 3, March, 1943, pp. 106-111, 359-362.)
667	11380	U.S.A. ...	*Cold Heat to Expedite Plywood Fabrication.* (C. S. Ricker, Aviation, Vol. 42, No. 3, March, 1943, pp. 116-120 and 327-333.)
668	11385	U.S.A. ...	*Theory and Technique of Perspective Projection—II (Airc. Prod.).* (G. F. Bush, Aviation, Vol. 42, No. 3, March, 1943, pp. 140-149 and 359.)
669	11387	U.S.A. ...	*Centralised Planning for Small Parts.* (J. H. Stephens, Aviation, Vol. 42, No. 3, March, 1943, pp. 217-225.)
670	11440	U.S.A. ...	*Single Assembly Line Produces both B-24 "Liberator Bombers" and C-87 "Liberator Express" Cargo Transports.* (R. C. Sebold and S. J. Powell, Aviation, Vol. 42, No. 4, April, 1943, pp. 126-133, 403-404.)

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671	11443	U.S.A. ...	*Aircraft Tool Planning—Part I.* (R. H. Luders, Aviation, Vol. 42, No. 4, April, 1943, pp. 144-147 and 374-378.)
672	11447	U.S.A. ...	*Theory and Technique of Perspective Projection—Part III.* (G. F. Bush, Aviation, Vol. 42, No. 4, April, 1943, pp. 171-174 and 368-371.)
673	11495	U.S.A. ...	*American Glider Industry.* (Inter. Avia., No. 868, 10/5/43, pp. 14-15.)
674	11549	U.S.A. ...	*American Aircraft Production.* (Engineer, Vol. 176, No. 4,566, 16/7/43, p. 58.)
675	11531	G.B.	*Design and Production Technique—Principles Involved in Shearing.* (A. J. Schroeder, Airc. Eng., Vol. 15, No. 173, July, 1943, pp. 207-212.)
676	11622	U.S.A. ...	*Aircraft Tool Planning—Pt. II.* (R. H. Luders, Aviation, Vol. 42, No. 5, May, 1943, pp. 179-181 and 430-437.)
677	11623	U.S.A. ...	*New Curtiss-Wright Propeller Conveyor Assembly Line.* (Aviation, Vol. 42, No. 5, May, 1943, p. 185.)
678	11625	U.S.A. ...	*Theory and Technique of Perspective Projection—Pt. IV.* (G. F. Bush, Aviation, Vol. 42, No. 5, May, 1943, pp. 194-197 and 375-376.)
679	11652	U.S.A. ...	*African Front Line Aircraft Assembly.* (Aero Digest, Vol. 42, No. 5, May, 1943, pp. 122-124.)
680	11655	U.S.A. ...	*Lofting Problems of Streamline Bodies—Pt. 13.* (C. M. Hartley and R. A. Liming, Aero Digest, Vol. 42, No. 5, May, 1943, pp. 160-164.)
681	11670	U.S.A. ...	*Wartime Production Short Cuts (Douglas Works).* (Aero Digest, Vol. 42, No. 5, May, 1943, pp. 367-371.)
682	11679	U.S.A. ...	*Automatic Pilots Production.* (Aero Digest, Vol. 42, No. 5, May, 1943, pp. 195-197.)
683	11696	U.S.A. ...	*Finishes for Plywood in the Aircraft Industry (Types and Applications).* (R. B. Anderson, A.S.M.E. Preprint, April 26-28, 1943.)
684	11917	U.S.A. ...	*Spot Welding in Aircraft Structures.* (E. S. Jenkins, Welding Literature, Vol. 5, No. 2, May, 1943, p. 106.)
685	11922	U.S.A. ...	*Survey of Arc Welding Practice in the Aircraft Industry.* (M. Nelles, Welding Literature, Vol. 5, No. 2, May, 1943, pp. 121-122.)
686	11927	Canada ...	*Aircraft Plywood and its Finishing Requirements—Pt. III.* (C. A. Carter, Commercial Aviation, Vol. 5, No. 2, March, 1943, pp. 96-98.)
687	11930	Canada ...	*Packard "Merlin" Production.* (F. M. Reck, Commercial Aviation, Vol. 5, No. 2, March, 1943, pp. 76-79.)
688	11932	U.S.A. ...	*Polishing "Plexiglas" Nose Assemblies (Photograph).* (Commercial Aviation, Vol. 5, No. 2, Feb., 1943, p. 182.)
689	11933	Canada ...	*Canadian Wright Engine Assembly Plants (Photograph).* (Commercial Aviation, Vol. 5, No. 2, Feb., 1943, pp. 128-130.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
690	11935	U.S.A. ...	*Lockheed's "Constellation" (Constructional Details) (Photograph).* (Commercial Aviation, Vol. 5, No. 2, Feb., 1943, pp. 110-118.)
691	11936	Canada ...	*Canadian De Havilland's Build "Mosquitos" (Photographs).* (Commercial Aviation, Vol. 5, No. 2, Feb., 1943, pp. 60-65.)
692	11937	Canada ...	*Canadian Vickers' Manufacture of Amphibians (Photographs).* (Commercial Aviation, Vol. 5, No. 2, Feb., 1943, pp. 66-68-90.)
693	11940	Canada ...	*Noordtyn Plant for Advanced Trainers.* (Commercial Aviation, Vol. 5, No. 2, Feb., 1943, pp. 80-84.)
			General Methods.
694	11051	U.S.A. ...	*Production of Specialised Precision Gears.* (Sci. Am., Vol. 168, No. 5, May, 1943, p. 199.)
695	11220	G.B.	*Recent Advances in Electro-Metallurgical Industry.* (J. W. Cuthbertson, Nature, Vol. 151, No. 3,841, 12/6/43, p. 676.)
696	11394	U.S.A. ...	*Technical Developments in High Production Sheet Metal Forming.* (W. Schroeder and J. H. Haylett, J.S.A.E., Vol. 51, No. 5, May, 1943, pp. 170-192.)
697	11658	U.S.A. ...	*Precision Production Welding.* (F. Shaw and Fogett, Aero Digest, Vol. 42, No. 5, May, 1943, pp. 237-242 and 337-339.)
698	11790	U.S.A. ...	*Mechanized Ammunition Manufacture.* (By Col. William E. Larned, Army Ordnance, Vol. 24, No. 138, May-June, 1943, pp. 504-509.)
699	11816	G.B.	*Composite Stampings Relieve Critical Shortages.* (By G. W. Birdsall, Engineer's Digest, Vol. 4, No. 2, Feb., 1943, pp. 49-51.)
700	11821	G.B.	*Rolling, Processing and Testing of Tin Plate. Pt. III: Pickling.* (By W. E. Hoare, B.Sc. (Eng.), and E. S. Hedges, M.Sc., Ph.D. (Manc.), D.Sc. (Lond.), A.I.C., Sheet Metal Industry, Vol. 17, No. 192, April, 1942, pp. 605-610.)
701	11824	G.B.	*Determination of the Thickness of Tin Coatings.* (Sheet Metal Industry, Vol. 17, No. 192, April, 1942, p. 625.)
702	11827	G.B.	*Spraying Inside Shells, Tubes and Containers.* (G. Montgomery, Sheet Metal Industry, Vol. 17, No. 192, April, 1942, p. 629.)
703	11831	G.B.	*Basis of a Rapid Degreasing Process.* (Sheet Metal Industry, Vol. 17, No. 192, April, 1942, pp. 658-659 and 673.)
704	11836	G.B.	*Treatment of Fusian Welds.* (A. J. T. Eyles, Sheet Metal Industry, Vol. 17, No. 192, April, 1942, pp. 691-692.)
705	11838	G.B.	*A New Electrode Holder for Arc Welding.* (Sheet Metal Industry, Vol. 17, No. 192, April, 1942, p. 696.)
706	11839	G.B.	*Radium in Industrial Radiography.* (R. L. Durant, Metal Treatment, Vol. 9, No. 32, 1942-1943, pp. 139-148.)

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707	11910	U.S.A.	*Improved Methods of Machine Flame Cutting.* (H. E. Rockefeller, Welding Literature, Vol. 5, No. 2, May, 1943, pp. 95-96.)
708	11929	Canada	*Plastic Punches for Drop Hammer and Hydraulic Press.* (Commercial Aviation, Vol. 5, No. 2, March, 1943, pp. 80-86.)
709	12045	U.S.A.	*Chromium Plate in Engineering Applications—its Thickness and Finishing.* (*Preprint No.* 29.) (T. G. Coyle, A.S.T.M., 1943 Preprints, June 28-July 2, 1943.)
			Equipment and Layout.
710	11408	U.S.A.	*Scale Models for Chemical Plant Construction.* (W. Alphin, Ind. and Eng. Chem., Vol. 21, No. 8, 25/4/43, pp. 556-558.)
711	11508	G.B.	*Special Purpose Horizontal Borer* (*Tech. Bull., June*, 1943). (J. of the Inst. of Prod. Engs., Vol. 22, No. 6, June, 1943, pp. 28-30.)
712	11814	Germany	*A New Automatic Sizing Gauge for External Cylindrical Grinding Machines.* (From Werkstatt und Betrieb, Vol. 75, No. 9, Sept., 1942, pp. 217-218.) (Engineers' Digest, Vol. 4, No. 2, Feb., 1943, pp. 45-46.)
713	11938	Canada	*Fairchild Plant Production Equipment* (*Photograph*). (Commercial Aviation, Vol. 5, No. 2, Feb., 1943, pp. 70-74.)
714	12085	U.S.A.	*Report of Committee D.* 19 *on Water for Industries Uses.* (*Preprint No.* 80.) (A.S.T.M., 1943 Preprints, June 28-July 2, 1943.)
715	12219	G.B.	*Triplex Process Steel Works in the U.S.A.* (*Combined Cupola, Converter, and Electric or Open Hearth Furnace*). (Engineer, Vol. 176, No. 4,569, 6/8/43, p. 109.)
716	12300	U.S.A.	*Automatic Rivet Bucker.* (Flying and Industrial Aviation, Vol. 33, No. 1, July, 1943, p. 114.)
717	12301	U.S.A.	*Moulded Plywood Tester.* (Flying and Industrial Aviation, Vol. 33, No. 1, July, 1943, p. 114.)
718	12302	U.S.A.	5,500-*Ton Press.* (Flying and Industrial Aviation, Vol. 33, No. 1, July, 1943, p. 114.)
			Scrap Salvage.
719	11840	G.B.	*The Salvaging of Worn and Under Machined Parts by Plating Methods.* (Metal Treatment, Vol. 9, No. 32, 1942-1943, p. 148.)
720	12082	U.S.A.	*Report of Committee D.* 12 *on Scraps and Other Detergents.* (*Preprint No.* 76.) (A.S.T.M., 1943 Preprints, June 28-July 2, 1943.)
721	12234	G.B.	*The Importance of Separating Steel Scrap.* (Prod. and Eng. Bull., Vol. 2, No. 7, May, 1943, pp. 309-311.)
			Welfare.
722	11422	G.B.	*Localised Exhaust Appliances for Control of Fumes, Dust, Gases, etc.* (Metal Industry, Vol. 62, No. 25, 18/6/43, p. 396.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
723	11612	U.S.A. ...	*Transparent Plastic Hood for Moving Parts of Machine to Protect the Worker (Lumarith).* (Ind. Eng. and Chem. (News Ed.), Vol. 21, No. 10, 25/5/43, p. 827.)
724	11650	U.S.A. ...	*Some Elements of Plant Camouflage.* (H. Goff, Aero Digest, Vol. 42, No. 5, May, 1943, pp. 119-121 and 347.)
725	11669	U.S.A. ...	*Welders' Safety Clothing.* (Aero Digest, Vol. 42, No. 5, May, 1943, p. 397.)
726	11882	Germany ...	*Health Protection of Workers in the Explosives Industry (German State Regulations).* (Bulletin of War Medicine, Vol. 3, No. 9, May, 1943, pp. 529-531.)
727	11883	U.S.A. ...	*Metabolic Disturbances in Workers Exposed to Dinitrotoluene.* (L. C. McGee and others, Bulletin of War Medicine, Vol. 3, No. 9, May, 1943, p. 531.)
728	11884	U.S.A. ...	*Trauma of the Skin Due to Wartime Activities.* (J. G. Downing, Bulletin of War Medicine, Vol. 3, No. 9, May, 1943, pp. 531-532.)
729	11894	G.B.	*The Health and Efficiency of Munition Workers (Book).* (H. M. Vernon (Publishers: Humphrey Milford, Oxford University Press, 138 pp., 1940), Bulletin of War Medicine, Vol. 1, No. 3, Jan., 1941, pp. 197-198.)
730	11902	G.B.	*Heating, Ventilation and Lighting for Industry in Wartime.* (W. D. Seymour (Occupational Psychology, 1940, Jan., Vol. 14, No. 1, pp. 56-64), Bulletin of War Medicines, Vol. 1, No. 4, March, 1941, pp. 266-267.)
731	11928	Canada ...	*Fire Fighting Mistakes.* (H. E. Heigis, Commercial Aviation, Vol. 5, No. 2, March, 1943, pp. 99-101.)
732	12235	G.B.	*Black-Out Ventilation.* (Prod. and Eng. Bull., Vol. 2, No. 7, May, 1943, pp. 313-314.)
733	12296	U.S.A. ...	*Accident Prevention in Aircraft Production.* (W. S. Rhodes, Flying and Industrial Aviation, Vol. 33, No. 1, July, 1943, pp. 105-106, 116-119.)

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734	11265	G.B.	*The Alaska Highway: Its Survey and Construction—II.* (Engineer, Vol. 175, No. 4,563, 25/6/43, pp. 499-500.)
735	11789	U.S.A. ...	*Amphibious Jeep (Photograph).* (Army Ordnance, Vol. 24, No. 138, May-June, 1943, p. 503.)
736	11795	U.S.A. ...	*Tyre Conservation.* (By R. Wood, Army Ordnance, Vol. 24, No. 138, May-June, 1943, pp. 547-550.)
737	12228	Germany ...	*Electrical Speed Control of the Towing Carriage of the Göteborg Tank.* (W. Hinterthan, Schiff und Werft, Vol. 44-24, No. 11-12, June, 1943, pp. 187-191.)
738	12240	G.B.	*Suspension Springs for Railcars and Motor Coaches.* (P. K. Beemer and Lindvall, Automobile Engineer, Vol. 33, No. 438, July, 1943, pp. 283-287.)

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739	12277	U.S.A.	...	*Has Aviation Doomed the Tank?* (W. Lenenor, Flying and Industrial Aviation, Vol. 33, No. 1, July, 1943, pp. 21-23, 128-130.)
740	12303	U.S.A.	...	*Goodyear's New Channel Tread Tyre.* (Flying and Industrial Aviation, Vol. 33, No. 1, July, 1943, p. 116.)
741	12313	U.S.A.	...	*Preventive Maintenance for Trucks and Passenger Cars.* (National Petroleum News, Vol. 35, No. 15, 14/4/43, pp. 24-30.)

WIRELESS AND ELECTRICITY.

Radio Direction Finder, Transmitter, Tele-communication, etc.

742	11631	U.S.A.	...	*Instrument Approach by Radio Direction Finder (Pt. I).* (C. H. McIntosh, Aviation, Vol. 42, No. 5, May, 1943, pp. 224-225 and 317-325.)
743	11734	G.B. ...	...	*Abstracts and References Compiled by Radio Research Board (Wireless Engineer).* (July, 1943.)
744	12275	U.S.A.	...	*U.S. Army Portable Transmitter-Receiver.* (Wireless World, Vol. 49, No. 7, July, 1943, pp. 196-197.)
745	12276	G.B. ...	...	*Waves in Metals and the Ionosphere.* (M. Johnson, Wireless World, Vol. 49, No. 7, July, 1943, pp. 208-211.)
746	12316	G.B. ...	...	*The University Education and Industrial Training of Engineers, with Particular Reference to Telecommunications (with Discussion).* (W. Jackson, J. Inst. Elect. Engs., Vol. 90, Pt. III, No. 10, June, 1943, pp. 53-72.)
747	12318	G.B. ...	...	*The Technique of Frequency Measurement and its Application to Telecommunications (Discussion).* (J. Inst. Elect. Engs., Vol. 90, Pt. III, No. 10, June, 1943, pp. 73-74.)
748	12337	U.S.A.	...	*An Improved Cosmic Ray Radio Sonde.* (W. H. Pickering, Review of Scientific Instruments, Vol. 14, No. 6, June, 1943, pp. 171-173.)
749	12347	U.S.A.	...	*"Radar" Radio Detecting and Ranging.* (Review of Scientific Instruments, Vol. 14, No. 6, June, 1943, pp. 192-193.)

Electrical Properties of Materials, Dipole Theory, Electronics.

750	10688	G.B. ...	...	*The Electrical Properties of Fibres—I.* (J. W. Illingworth, Textile Recorder, Feb., 1943, pp. 39-43.) (Met. Vick. Tech. News Bull., No. 864, 30/4/43, p. 1.)
751	10696	G.B. ...	...	*Electrical Properties of Fibres—II.* (J. W. Illingworth, Textile Recorder, March, 1943, pp. 42-46.) (Met. Vick. Tech. Bull., No. 859, 26/3/43, p. 3.)
752	11509	G.B. ...	...	*Electrolytic Aspects of High Polymeric Systems.* (B. J. Brajnikoff, Plastics, Vol. 7, No. 74, July, 1943, pp. 314-322.)
753	11613	U.S.A.	...	*Electrical Engineering Abstracts—Section B.* (Issued by the Inst. Elect. Engs., Vol. 46, No. 546, June, 1943.)

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754	12005	G.B.	*A New Method of Electrical Testing Applied to Enamelled Insulated Wires (Effect of Temperature).* (H. A. MacDonald and E. C. R. Scarfe, Nature, Vol. 152, No. 3,845, 10/7/43, pp. 51-52.)
755	12006	G.B.	*Ultra High Electro-Magnetic Frequencies.* (Nature, Vol. 152, No. 3,845, 10/7/43, p. 54.)
756	12208	G.B.	*The Dipole Theory and the Characteristics of Organic Insulators.* (T. F. Wall, Engineering, Vol. 156, No. 4,046, July 30, 1943, pp. 81-83.)
757	12213	Germany ...	*Three-Phase Synchronous Motors.* (From Elektrotechniq. und Maschinenbau, May 22, 1942, p. 234.) (W. Putz, Engineering, Vol. 156, No. 4,046, July 30, 1943, pp. 94-95.)
758	12317	G.B.	*Discussion on "Electronics in Industry."* (J. Inst. Elect. Engs., Vol. 90, Pt. III, No. 10, June, 1943, pp. 72-73.)
759	12336	U.S.A. ...	*An Electronic Circuit to Control Intensity and Timing of Power for Spot Welding.* (W. B. Nottingham, Review of Scientific Instruments, Vol. 14, No. 6, June, 1943, pp. 161-170.)
760	12401	G.B.	*The Organization of Post-War Electrical Research.* (Journal of the Institution of Electrical Engineers, Vol. 90, Pt. I, No. 30, July, 1943, pp. 261-263.)
761	12402	G.B.	*Standardization as Applied to Industrial Electrical Instruments (with Discussion).* (K. Edgcombe, Journal of the Institution of Electrical Engineers, Vol. 90, Pt. I, No. 30, July, 1943, pp. 263-297.)
762	12403	G.B.	*The Design of Ultra Short Wave Field Strength Measuring Equipment (Abstract).* (F. M. Colebrook and A. C. Gordon-Smith, Journal of the Institution of Electrical Engineers, Vol. 90, Pt. I, No. 30, July, 1943, pp. 300-301.)
763	12404	G.B.	*The Determination of the Electrical Properties of Soil at a Wavelength of 5 Metres (Frequency 60 Mc/S.) (Abstract).* (J. S. McPetrie and J. A. Saxton, Journal of the Institution of Electrical Engineers, Vol. 90, Pt. I, No. 30, July, 1943, p. 301.)
764	12405	G.B.	*The Measurement of the Characteristics of Concentric Cables at Frequencies Between 1 and 100 Megacycles per Second.* (T. I. Jones, Journal of the Institution of Electrical Engineers, Vol. 90, Pt. I, No. 30, July, 1943, p. 302.)

HEAT AND LIGHT.

Thermal Scattering of X-Rays, Rate of Ice Formation, Reflectivity Measurement of Metals, etc.

765	11579	U.S.A. ...	*Determination of Optical Constants of Metals by Reflectivity Measurements.* (J. R. Collins and R. O. Bock, Rev. of Sci. Instrum., Vol. 14, No. 5, May, 1943, pp. 135-141.)
766	11604	U.S.A. ...	*Photo Chemical Stability of Papers.* (H. F. Launer and W. K. Wilson, J. Res. Bur. Stands., Vol. 30, No. 1, Jan., 1943, pp. 55-74.)

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767	11709	U.S.A. ...	*Rate of Ice Formation.* (A. L. London and R. G. Coll, A.S.M.E. Preprint, April 26-28, 1943.)
768	11817	G.B.	*Heating by Reversed Refrigeration.* (By R. D. Heitchue, Engineer's Digest, Vol. 4, No. 2, Feb., 1943, pp. 51-53.)
769	12007	G.B.	*Thermal Scattering of X-Rays by Crystals.* (G. H. Begbie and M. Born, Nature, Vol. 152, No. 3,844, 3/7/43, pp. 19-20.)
770	12011	G.B.	*Insulation of Heating Systems.* (Nature, Vol. 151, No. 3,838, 22/5/43, p. 593.)
771	12231	G.B.	*Thermodynamics of Crystal Lattices.* (M. Born and M. Brhoborn, Cambridge Philosophical Society Proceedings, Vol. 39, No. 2, June, 1943, pp. 100-127.)

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772	11445	U.S.A. ...	*Photoprint Process of Loft Layout Reproduction.* (F. B. Marshall, Aviation, Vol. 42, No. 4, April, 1943, pp. 154-161.)
773	11559	U.S.A. ...	*A Method for Removing Microscopic Fog from Photographic Plates.* (L. N. Lieberman and H. H. Barschall, The Rev. of Sci. Instrum., Vol. 14, No. 4, April, 1943, pp. 89-90.)
774	11665	U.S.A. ...	*Republic Aviation's Photographic Reproduction System.* (D. C. Cooke, Aero Digest, Vol. 42, No. 5, May, 1943, pp. 221-222, 292 and 296.)

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775	12004	G.B.	*The Solar Corona and Geomagnetism.* (Nature, Vol. 152, No. 3,845, 10/7/43, p. 44.)
776	12274	G.B.	*Tracing Thunderstorms—A Use for Atmospherics.* (J. S. Forrest, Wireless World, Vol. 49, No. 7, July, 1943, pp. 192-194.)

PHYSIOLOGY AND AVIATION MEDICINE. (EFFECTS OF ALTITUDE, CLIMATE, ETC.).

777	11090	Germany ...	*Air War at High Altitudes and Physiological Research.* (T. Benzinger, Luftwissen, Vol. 10, No. 4, April, 1943, pp. 105-110.)
778	11098	Germany ...	*Investigations on Particular Individual Variation of the Altitude Cramp Threshold. II, The Influence of Atmospheric Humidity on the Resistance of the White Mouse.* (Denyer, Luftfahrtmedizin, Vol. 7, No. 2-3, 1942, pp. 137-140.)
779	11099	Germany ...	*Height Adjustment for 8,000 m. Acquired at a Level 2,000 m. A Report from the Rechlin Experimental Station of the Luftwaffe dated 29th May, 1940.* (Benzinger and Doering, Luftfahrtmedizin, Vol. 7, No. 2-3, 1942, pp. 141-149.)
780	11100	Germany ...	*Research on the Influence of Oxygen Breathing on Alveolar CO_2 Tension in the Low Pressure Chamber.* (Schweppes, Luftfahrtmedizin, Vol. 7, No. 2-3, 1942, pp. 150-159.)

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781	11101	Germany ...	*Hyperæmia and Adrenaline Content of the Blood* (Lehmann and Michaelis, Luftfahrtmedizin, Vol. 7, No. 2-3, 1942, p. 292.)
782	11102	Germany ...	*Weather and Health. Vol. 1. The Determination of the Action Time and Estimation of the Influence of the Weather and the Sun's Action on Healthy Men. (Book Review.)* (Dull, Luftfahrtmedizin, Vol. 7, No. 2-3, 1942, p. 292.)
783	11103	Germany ...	*Carbide Dioxide Loses its Position of Importance. Reflections on Respiratory Regulation.* (O. Pizt, Luftfahrtmedizin, Vol. 7, No. 2-3, 1942, p. 118.)
784	11104	Germany ...	*The Course of the Apnoea Curve after very long Hyperventilation.* (Herrlinger, Luftfahrtmedizin, Vol. 7, No. 2-3, 1942, p. 119.)
785	11105	Germany ...	*The Conduction of the Brain Action Currents as a Method of Investigating Altitude Sickness.* (Kornmuller and others, Luftfahrtmedizin, Vol. 7, No. 2-3, 1942, p. 123.)
786	11106	Germany ...	*Nervous Disturbances at Low Pressure and Their Determination.* (Chauchard and others, Luftfahrtmedizin, Vol. 7, No. 2-3, 1942, p. 123.)
787	11107	Germany ...	*Changes in Sensitivity of the Circulatory Centre in Anoxæmia.* (Grosse-Brockhoff, Luftfahrtmedizin, Vol. 7, No. 2-3, 1942, p. 124.)
788	11108	Germany ...	*The Altitude Adjustment on the Jungfraujoch. II, Tidal Air and CO_2 System in Acute Oxygen Deficiency Before, During and After Altitude Adjustment.* (Becker-Freysing, Luftfahrtmedizin, No. 7, No. 2-3, 1942, pp. 180-204.)
789	11109	Germany ...	*The Altitude Adjustment on the Jungfraujoch. III, Increased Altitude Tolerance During Altitude Adjustment and After Return to Sea-Level.* (Luft and Opitz, Luftfahrtmedizin, Vol. 7, No. 2-3, 1942, pp. 205-217.)
790	11110	Germany ...	*The Altitude Adjustment on the Jungfraujoch. Adjustment Changes of Respiration at 3,500 m. and the Action of NH_4CL.* (Loeschke and others, Luftfahrtmedizin, Vol. 7, No. 2-3, 1942, p. 218.)
791	11111	Germany ...	*The Heat Regulatory Adjustment of the Organism in Fluctuating Climatic Conditions (Temperature, Humidity, Wind Velocity). I, The "Climate Chamber" for the Production of any Desired Climatic Conditions.* (Weyler and Thauer, Luftfahrtmedizin, Vol. 7, No. 2-3, 1942, p. 237.)
792	11112	Germany ...	*The Heat Regulatory Adjustment of the Organism in Fluctuating Climatic Conditions (Temperature, Humidity, Wind Velocity). II, Circulation and Gas Metabolism of Man in Different External Temperatures.* (Weyler and Thauer, Luftfahrtmedizin, Vol. 7, No. 2-3, 1942, p. 237.)
793	11113	Germany ...	*Experimental Investigation on the Increase of Venous Adjustment in Oxygen Deficiency.* (Frey and Kuchle, Luftfahrtmedizin, Vol. 7, No. 2-3, 1942, p. 260.)

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794	11114	Germany ...	*A Simple Experiment for the Simultaneous Measurement of the Maximum Pressure in Volsava's Experiments or in the Nasopharynx Pressure Experiment, with Indication as to which of the Two Experiments the Aviator can Employ to Produce Pressure Equilibrium in the Middle Ear.* (Nordhoff, Luftfahrtmedizin, Vol. 7, No. 2-3, 1942, p. 269.)
795	11115	Germany ...	*The Effect on Man of Persistent Oxygen Breathing at Various Altitudes.* (Becker-Freysing and Clamann, Luftfahrtmedizin, Vol. 7, No. 2-3, 1942, p. 272.)
796	11135	Germany ...	*Comparation Investigations on the Visual Field Capacity with Koch's Apparatus and with the Ziess Steroscope and Pulfrich's Test Tables.* (Weissig, Luftfahrtmedizin, Vol. 6, No. 1-4, 23/4/42, pp. 166-173.)
797	11136	Germany ...	*Height Tolerance on Mount Rosa. I, Rest Experiments; II, Work Experiments.* (Delius and others, Luftfahrtmedizin, Vol. 6, No. 1-4, 23/4/42, p. 213.)
798	11562	U.S.A. ...	*Biological Symposia. Vol. VII, Visual Mechanism (Abstracts).* (Rev. of Sci. Instrum., Vol. 14, No. 4, April, 1943, pp. 108-110.)
799	11568	U.S.A. ...	*Vision, Hearing and Aeronautical Design.* (L. D. Carson and others, J. Aeron. Sci., Vol. 10, No. 4, April, 1943, pp. 127-130.)
800	11865	Canada ...	*Medical Aspects of Air Crew Selection.* (F. A. L. Mathewson, Bulletin of War Medicine, Vol. 3, No. 10, June, 1943, p. 583.)
801	11866	U.S.A. ...	*Nitrogen Clearance from the Blood and Saliva by Oxygen Breathing.* (P. F. Scholander and G. A. Edwards, Bulletin of War Medicine, Vol. 3, No. 10, June, 1943, pp. 583-584.)
802	11867	Germany ...	*Limits of Cardiac Output Increase in Acute Oxygen Lack.* (Abstract, Luftfahrtmedizin, Vol. 7, No. 1, 1942, pp. 1-8.) (H. H. Loeschcke, Bulletin of War Medicine, Vol. 3, No. 10, June, 1943, p. 584.)
803	11868	Germany ...	*Decompression Sickness.* (W. Hornberger and T. Benzinger, Luftfahrtmedizin, Vol. 7, No. 1, 1942, pp. 9-34.) (Bulletin of War Medicine, Vol. 3, No. 10, June, 1943, p. 584.)
804	11869	Germany ...	*Rapid Decompression in Mammals.* (R. Kilches, Luftfahrtmedizin, Vol. 7, No. 1, 1942, pp. 35-45.) (Bulletin of War Medicine, Vol. 3, No. 10, June, 1943, p. 584.)
805	11870	Germany ...	*Muscular Tone in Acute Anoxia.* (J. Schnell, Luftfahrtmedizin, Vol. 7, No. 1, 1942, pp. 68-83.) (Bulletin of War Medicine, Vol. 3, No. 10, June, 1943, p. 585.)

MATHEMATICS AND PHYSICS.

806	11809	U.S.A. ...	*Euler's Number.* (Mechanical Engineering, Vol. 65, No. 3, March, 1943, pp. 210-211.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
807	12012	G.B. ...	... *H. L. Callendar and the Theory of the Liquid State.* (Nature, Vol. 151, No. 3,838, 22/5/43, pp. 588-589.)
808	12221	G.B. ...	... *Steering Experiments (Forces on Elliptical. Rectangular and Square Planes).* (R. W. L. Gawn, (Engineer, Vol. 176, No. 4,569, 6/8/43, pp. 116-118.)

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NOTE.—As far as possible, the country of origin quoted in the items refers to the original source.

The Fundamentals of Photoelastic Stress Analysis Applied to Dynamic Problems. (W. N. Findley, Eastern Photoelasticity Conference, Cornell University, 1939, pp. 1-11.) (116/1 U.S.A.)

Photoelastic stress analysis depends on the fact that for most transparent isotropic solids the velocity of propagation of polarised light will depend on whether the beam is polarised along or perpendicular to the direction of stress. Moreover, this velocity depends on the state of stress.

If a beam is subjected to pure bending, only longitudinal stresses are set up which vary directly as the distance from the neutral plane. The state of stress is thus constant in a series of planes parallel to the neutral plane, reaching its maximum values (compression or tension) on the outer surface of the beam. If such a transparent beam is illuminated laterally by polarised monochromatic light, the plane of polarisation being inclined at 45° to the axis of the beam, the component in the plane of stress will travel at a different speed to the component perpendicular to the stress and on examining the transmitted light through an analyser, interference fringes parallel to the neutral plan of the beam will be seen.

In the neutral plane itself, since there is no stress, the vertical and horizontal components of the polarised light remain in step and will both be extinguished by the analyser, resulting in a dark fringe. The next dark fringe will appear when the retardation due to the state of stress of the material is equivalent to a path difference of one wavelength between the two polarised components of the light.

In general we thus have

$$n\lambda = c\sigma t \quad . \quad . \quad . \quad . \quad . \quad . \quad (1)$$

where n = fringe order.
σ = state of stress.
c = photoelastic constant of material.
t = width of beam (path length).

Fringe order zero ($\sigma = 0$, $n = 0$) thus corresponds to the neutral plane.
If λ is measured in A units

σ 16 psi
t inches
c Brewster
$n\lambda = 1.75\ ct$

The following values of c are of interest:—

	c
Optical glass ...	1 – 10
Celluloid ...	20
Bakelite ...	60
Gelatine ...	± 10,000

The higher c, the smaller the stress increment between successive fringes. Thus with $\lambda = 4{,}400$ and thickness of beam = 1 in., the stress increment
= .25 psi for gelatine
= .40 psi for bakelite.

Since in pure bending,

$$\sigma = (M/I)\, y = (E/\rho)\, y$$

where y = distance from neutral plane.
ρ = radius of curvature.
M = bending moment.
I = moment of inertia of section,

we have

$$n\lambda = c\,(M/I)\, y\, .\, t \quad . \quad . \quad . \quad . \quad . \quad (2)$$

where y = distance of fringe of order n from neutral axis.

For a given beam and bending moment, y/n is therefore constant, *i.e.*, the fringes are equally spaced. Also the fringes order n corresponding to a given distance y varies directly as the bending moment, *i.e.*, the fringes are the closer together, the higher the bending moment. Static tests have confirmed these conclusions in the case of bakelite and celluloid under pure bending.

From equation (2) we obtain

$$\lambda/c = \text{fringe value} = (y/n) \times (t) \times (E/\rho) \quad . \quad . \quad . \quad . \quad . \quad (3)$$
$$= \text{constant for a given material.}$$

$$\text{Also } \frac{\text{fringe value} \times \text{order number}}{\text{width of beam}} = \text{longitudinal stress.}$$

For bakelite $\lambda/c = 71.1$
For celluloid $\lambda/c = 211$
} static conditions, $\lambda = 4{,}481\ A$.

For the same size beam and bending moment, therefore

$$\overline{y/n}\Big|_{\text{bakelite}} = (1/3)\ \overline{y/n}\Big|_{\text{celluloid}}$$

i.e., the fringes are much more closely packed in the former material.

The object of the author's experiments was to determine whether λ/c depends markedly on the rate of loading. Now it is known that the fringe value of both bakelite and celluloid depends on the previous stress history and the static values quoted above only apply to the first loading of freshly prepared (annealed) material.

The effect of rate of loading can therefore only be investigated for a single application of the load. For this purpose the author devised a loading machine consisting of a rotating flywheel fitted with a cam, the bending moment on the specimen being produced by a roller actuating a yoke contacting the ends of the beam. A special electric relay enables the roller to be displaced so as to miss the cam, this enabling the flywheel to be run up to speed. At the required instant, the roller is allowed to contact the flat portion of the cam and withdrawn again after maximum deflection.

The fringe pattern during the bending process is photographed on a rotating film, the light source being a high frequency spark of short duration. The central deflection of the beam corresponding to each pattern can also be measured from the photographs and thus the radius of curvature of the beam estimated. Assuming that E maintains its static value, the fringe value can therefore be calculated from equation (3), the factor (y/n) being determined by the fringe spacing on the particular photograph. By repeating the experiment at different flywheel speeds, any effect of rate of loading on fringe value is rendered obvious.

The results show that in case of bakelite λ/c is not affected by rate of loading, the average fringe value under dynamic conditions being certainly within 1 per cent. of the static value (71.1). In the case of celluloid however, the dynamic fringe value is about 16 per cent. less than the static value, this drop being already indicated at the lowest experimental speed. Subsequent increase in speed of loading apparently produces no further effect.

The above conclusions depend on the fact that the test was carried out under pure bending and that E is not affected by speed of loading.

Further experiments are in hand to verify the constancy of C and E under more general conditions.

Gelatine Models. (T. R. Cuykendell, Eastern Photoelasticity Conference, Cornell University, 1939, pp. 13-17.) (116/2 U.S.A.)

Gelatine models have been successfully employed for the study of foundation stresses in gravity earth dams, the main interest being the effect of slope of the dam on the toe stresses. Details of making the model are given. The main difficulty is to free the gelatine from the glass surfaces of the mould after casting and the subsequent replacement of the model.

It was found that a preliminary lining of the glass mould with cellophane .001 in. thick facilitated removal from the mould whilst subsequent freedom of the model under the action of gravity was ensured by a thin film of lubricating oil on the cover glasses.

The calibration of the material was effected by cutting a suitable prism from the body of the model and loading it with mercury. Straight line calibrations are obtained, the fringe value of the material being of the order of .23 psi ($c = 10{,}000$ Brewsters, see Abstract 116/1).

Gelatine, although attractive in many respects on account of its cheapness and the relative ease with which large models can be prepared, suffers from the drawback that the fringe value alters with time (about 10 per cent. in 15 hours) and that successive melts and casts of the same concentration may differ by as much as 15 per cent., depending on the treatment of the material. A detailed study of the elastic-optical properties of the gelatine is therefore of limited value for general use, since the physical properties depend so much on manipulation, remelt, pH value, shrinkage or swelling at the surfaces.

It appears, however, that satisfactory models can be made, provided precautions are taken during manufacture (*e.g.*, the gelatine should be in the liquid form for as short a time as possible) and that the model is frequently tested for permanent relative retardation, non-linearity of stress optical coefficients, swelling, etc.

Three Dimensional Photoelastic Analysis by Scattered Light. (R. Weller, Eastern Photoelastic Conference, Cornell University, 1939, pp. 19-21.) (116/3 U.S.A.)

The difficulty of three dimensional photoelastic stress analysis is due to the fact that the phase difference of the emerging beam represents the integrated effect of the whole path and thus gives no information of the distribution of stress. If, however, a source of polarised light could be obtained inside the model, the motion of this source along a given path away from the observer would enable us to judge the state of stress along this path, since a uniform stress would require dN/dS=constant where N=number of fringes corresponding to a displacement S of the source.

Such a source of polarised light within a model may be produced by scattering. Consider, for example, a horizontal tension member made of transparent plastic and illuminated from below through a slit placed parallel to the stress axis. A thin longitudinal section is thus illuminated. The light is polarised at 45° to the slit length and on entering the model will be split into two equal components, respectively, along the perpendicular to the beam. As the beam of light penetrates the model, the relative phase of the two components will differ and at certain points will amount to multiple of one wavelength. All such points, when viewed at right angles to the original plane of polarisation will appear as bright bands due to scattered light whilst those with a phase difference corresponding to a multiple of half wave lengths will appear black under similar conditions. If the fringe value of the material of the model is known, the stress will follow directly by dividing this constant by the fringe spacing. The closer the spacing, the higher the stress.

Refraction at the boundaries of the model is eliminated by immersing the latter in a liquid of the same refractive index as that of the transparent solid. (In the case of bakelite, a mixture of Halowax oil and mineral oil.)

It should be pointed out that the stress distribution obtained in this manner corresponds to that existing in the thin internal section illuminated by the beam of light and is not affected by the outside material of the model.

Fixing our attention on some particular point inside the model, it is now possible to orientate the model so that the fringes are most closely packed. The light direction is now normal to the plane containing the largest and smallest principal stress. The model is next rotated through 90° about a line in this plane and then turned in a plane normal to the light beam and the positions of closest and widest spacings of the fringes noted. Both the maximum shear and the three principal stress directions are thus known exactly as in conventional two dimensional photoelastic analysis. Since at the free boundary one of the principal stresses is zero, the other two may be evaluated by observing consecutively the fringe spacing in a plane containing the zero stress and one of the other stresses.

The values at the interior of the model may then be estimated by the network method. The main disadvantage of the scattered light method of photoelasticity is the relatively long exposure time required for complicated stress patterns. In this case the width of the slot must necessarily be small. Using $\frac{1}{8}$ in. width, an 85 watt mercury arc, exposure varying from 30 minutes to six hours were required by the author.

Two examples of scatter fringes obtained respectively with a circular and square shaft under torsion are given.

The Preparation of Photoelastic Models. (M. L. Price, Eastern Photoelastic Conference, Cornell University, 1939, pp. 23-26.) (116/4 U.S.A.)

Photoelastic investigations were originally carried out on glass models, but difficulties of manufacture of the models and application of the load severely restricted practical applications.

Useful progress was only made with the advent of optically sensitive plastics which can be easily cut to shape and produce a closer fringe spacing. At the moment, the most generally employed material is water-white bakelite, BT 61-893. Only in special cases, especially for large models, alternative materials such as celluloid and gelatine are employed.

The bakelite is available in standard plates $6 \times 12 \times \frac{1}{4}$ inch (rough sawn) with the surfaces either polished or unpolished. On account of the great saving in cost, the author recommends carrying out the polishing in the laboratory. It appears that satisfactory results can be obtained by rubbing the specimen over with various grades of emery paper supported on a smooth surface such as glass.

For the actual manufacture of the model, the author recommends selecting areas of the plate which preliminary examination has shown to be reasonably free from stress. The profile of the model is then laid on the polished surface and the part cut out by a machine powered jig saw operating at about 500 strokes per minute, $\frac{1}{16}$ to $\frac{1}{8}$ in. excess stock being left for finishing. This is carried out with a rotary file.

Simple shapes can also be produced on a milling or shaping machine, provided very sharp tools ground to give ample relief and produce a shearing cut are employed. Light cuts and low cutting speeds must be employed, with a light mineral oil or soda water as coolant.

If great care is taken, the residual stress effect is small and the model can be immediately used, before drying out of the edges introduces optical effects. If necessary, small inherent stresses can be allowed for by taking a preliminary fringe pattern at about 10 per cent. full load and working by difference.

In case of larger inherent stresses, however, and in all cases where the model is intended for instructional purposes necessitating long periods of utilisation, some form of annealing is required. For this purpose immersion in an oil bath at 230°F. for 2-3 hours is recommended. The subsequent cooling must be very slow, the maximum rate being 3-6°F. per hour. The author points out that annealing sometimes introduces more serious effects than the faults it is supposed to remedy. For this reason every effort should be made both in the selection of the material and subsequent machining of the model to prevent accumulation of stresses and make direct observation possible.

Stress Peaks in Cold Worked Riveted Plates. (M. Koenig, Schweizer Archiv., Vol. 3, No. 2, Feb., 1937, pp. 41-46.) (116/5 Switzerland.)

The cold working of rivets introduces additional radial and tangential stresses in the plate hole due to the expansion of the rivet shaft. These stresses are similar to those arising when a rivet of larger diameter is inserted in a hole previously expanded by heating the plate and then allowing the plate to cool. (Theory of shrinkage.)

If r = initial diameter of rivet hole (cm.).
E = modulus of plate kg./cm.^{2}.
Δ = expansion of hole (cm.).
x = distance from centre of hole.

The radial and tangential stresses are given by

$$\left.\begin{aligned} \sigma_r &= -p_A\left(\frac{r^2}{x^2}\right) \\ \sigma_t &= +p_A\left(\frac{r^2}{x^2}\right) \end{aligned}\right\} \quad \ldots\ldots (1)$$

where $p_A = E\Delta/2r$ = specific shrinkage pressure.

On the assumption of an elastic deformation of .15 per cent. over and above the permanent set, we have $\Delta/2r = .15/100$

$p_A = E\,(\Delta/2r) = 1050$ kg./cm.^{2} ($E = 7{,}000{,}000$ for Al.).

This is the radial or tangential stress at the hole since $r/x=1$, and is constant round the periphery. If several holes are present, the stress pattern will superpose, leading to slightly higher edge stresses at certain points of the intermediate holes.

If now the riveted joint is subjected to tension, two further sets of stress fields are introduced.

(1) The rivet, acting as a pin, will subject one side of the hole to a mean bearing pressure p_L given by

$$p_L=\frac{P_r}{ds}$$

where P_r = load on rivet.
d = diameter of hole.
s = thickness of plate.

In the case of single row rivets, $P_r=P_T/n$,

where P_T = total tensile load on plate.
n = number of rivets.

P_T is fixed by the fact that the plate stress in the metal between the holes must not exceed a certain limiting value, on the assumption that this stress distribution is uniform and not affected by the presence of the hole. This will be considered in section (2) below.

Experiment has shown that the actual stress at the edge of the hole in the direction of pull may attain 2.5 p_L.

With increasing distance from the edge of the hole (in direction of pull)

$$\sigma=\pm p_L\left(\frac{r^2}{x^2}\right). \quad . \quad . \quad . \quad . \quad . \quad . \quad (2)$$

(2) The effect of the hole on the stress distribution is expressed by the author as follows:—

$$\left.\begin{aligned}\sigma_t&=\frac{1}{2}p\left(1+\frac{r^2}{x^2}\right)-\frac{1}{2}p\left(1+\frac{3r^4}{x^4}\right)\cos 2\phi\\ \sigma_r&=\frac{1}{2}p\left(1-\frac{r^2}{x^2}\right)+\frac{1}{2}p\left(1-\frac{3r^2}{x^2}\right)\cos 2\phi\end{aligned}\right\} \quad . \quad . \quad . \quad (3)$$

where p = basic load on plate (kg./cm.^{2}).
ϕ = angle between direction of external load and point under consideration, as viewed from centre of hole.

The actual stress distribution of the riveted plate under tensile load is then given by the superposition of the three tensile fields considered above, *i.e.*:—

(1) Elastic deformation of edge due to expanding rivet shaft.
(2) Bearing pressure.
(3) Hole effect.

Of these (1) is independent of the external load applied.

The author has carried out this summation for a simple riveted joint of the following dimensions:—

Diameter of rivet	...	1.3 cm.
Rivet spacing	...	3.25 cm.
Number of rivets	...	2
Edge spacing	...	2.6 cm. (symmetrical)
Plate thickness	...	.5 cm.
Basic load on plate	...	500 kg./cm.^{2}

Four quadrant positions at the circumference of the hole are considered, labelled respectively 1, 2, 3 and 4 in a clockwise direction.

The external load is applied in the direction 1-3, maximum bearing pressure being exerted at 1.

The following table gives the stresses at the individual positions due to the various component loads as well as their summation for a single hole. The

number in brackets gives the corresponding stress equation. These stresses will vary with distance from the edge in accordance with the equations given above and the stress pattern due to a number of holes in the resultant of the individual patterns.

In the example considered by the author, this will lead to a small increase of stress in the region between the holes.

	Position Number.							
	1		3		2		4	
Type of Stress.	σ_t	σ_r	σ_t	σ_r	σ_t	σ_r	σ_t	σ_r
Elastic Deformation (1) .	1050	−1050	1050	−1050	1050	−1050	1050	−1050
Bearing Load (2) . .	2250	−2250	0	0	0	0	0	0
Hob Effect (3) . . .	− 500	0	− 500	0	1500	0	1500	0
Total (Kg./cm.²) .	2800	3300	550	−1050	2550	−1050	2550	−1050

It will be noted that even without any external load, the edge stress due to elastic deformation is considerable. If the joint is subjected to a relatively small load corresponding to 500 kg./cm.², the edge stresses reach a peak value of 3,300 kg./cm.² at position 1.

Now we know from the practical behaviour of such riveted joints that their fatigue strength is superior to that of a welded joint.

It is then clear that the theoretical peak stresses calculated above must equalise themselves largely by plastic flow and permanent stretch.

The above investigation nevertheless emphasises the need of certain precautions to ensure best results with riveted joints. These are given below.

(1) The plate stress should be kept as low as possible.
(2) The rivet hole should be clean and free from cracks.
(3) The rivet spacing must not be too small.
(4) The rivet distance from the edge of the plate should be sufficient to ensure the local hole stresses have largely disappeared.
(5) The edges of the plate should be smooth and free from cracks.

Auxiliary Motors for High Performance Gliders. (E. Huttemann, Sportflieger, Vol. 9, No. 8, August, 1942, p. 175.) (116/6 Germany.)

The advantages of fitting an auxiliary motor to a glider are very great, since it would enable the pilot to search for suitable meteorological conditions of the atmosphere and render " target " flights more generally possible. The essential condition, however, is that the performance of the aircraft as a glider is not seriously jeopardised and that the engine can be started at will.

Early attempts were failures, the drag with the engine stopped being such that the rapid loss of height restricted possible glides. In order to save weight, no starter was fitted and the engine had then to be run continuously. Even at small throttle, the fuel weight to be carried restricted the possible range and the compression solution offered no advantages being both a poor aircraft and a worse glider.

A new design brought out by the Chemnitz gliding association appears to overcome these difficulties. Known as the C10 it is fitted with an 18 h.p. Krober engine placed inside the fuselage behind the pilot and driving a rear airscrew. This screw is fitted with hinged blades which fold inside the tail boom when the engine is stopped. Under these conditions, and with ventilating slot shut, the aircraft has a gliding angle of 1.22 at 85 km./h. and a rate of descent of .85 m./sec. at 65 km./h. With engine under operation, and ventilating slots open, a rate of climb of 1.9 m./sec. is possible.

Since the engine can be easily started by hand, it need only be in operation over restricted periods with the result that only a small quantity of fuel need be carried. The equivalent of one hour's continuous operation is considered sufficient, since it will enable the pilot to climb four to six times to an altitude of

about 1,000 m. from which he can start a fresh glide. A machine of the type considered should prove of very great value since valuable gliding experience can be gained at very little cost.

The Realisation of the Aircraft Propeller Landing Brake. (A. V. der Muhll, Flugwehr u. Technik, Vol. 5, No. 2, Feb., 1943, pp. 51-54.) (116/7 Switzerland.)

Any propeller can be converted into a brake (negative thrust) either by reversing its direction of rotation or by a suitable change in pitch. The former method has been used on board ship for a very long time, but recently the variable pitch form has also been successfully applied in this field. On aircraft, the propeller brake was first considered for limiting the speed during a dive. Obviously only the variable pitch type con be considered in this case. The experiments, however, proved unsuccessful for two reasons:—

(1) During a high speed dive, the negative thrust required is very large and it is difficult to provide the necessary stiffness for the blades and control mechanism without excessive weight.

(2) Unless the pitch change during the dive is very rapid, a considerable increase in r.p.m. will occur as the propeller passes through the region of small pitch (windmilling). Normal values of the r.p.m. will only return when the full negative pitch is reached. Even if the propeller could be designed to stand this speeding up over a period, there is a grave risk of the engine being damaged.

In order to limit the speed increase to less than 10 per cent., it is imperative that the full change in pitch (say from $+40°$ to $-30°$) be carried out in less than 2 seconds, *i.e.*, at a minimum rate of 40°/sec.

Before the advent of the Escher-Wyss design, the maximum rate of change of pitch of existing types of variable pitch propellers averaged only 1° to 3°/sec. and such propellers were therefore totally unsuited for the serving as an air brake during a dive.

High rates of change of pitch are difficult to produce by electrical means. Propellers working on this principle usually employ an electric motor of about $\frac{1}{4}$ to $\frac{1}{2}$ h.p. sufficient for a rate of change of pitch of about 2°/sec. It is estimated that a pitch change rate of 30°/sec. would require about 12 h.p. assuming constant gear efficiency. In practice at least 15 h.p. would be required and it would be quite impossible to provide a satisfactory housing for such a motor together with the necessary reduction gear inside the propeller hub. According to the author, the only feasible method of providing the necessary power is by hydraulic means and for this purpose the Escher-Wyss design utilises a reserve of oil under high air pressure which is admitted directly to the propeller mechanism when the quick change of pitch is required. (For normal changes in pitch the ordinary circuit oil controlled by an automatic speed governor is employed.)

In the Escher-Wyss propeller the control lever, as usually fitted on hydraulically operated variable pitch propellers, is provided with a special gate, passage through which disconnects the governor and applies the high pressure system. The extra weight entailed for the braking control including oil storage cylinder is about 12 kg.

The maximum rate of change of pitch obtainable with the present Escher-Wyss propeller is of the order of 20°/sec. As already stated, this is not yet sufficient for a satisfactory diving brake, but very satisfactory for landing purposes at which the air speeds are much lower. As is well known, the Escher-Wyss propeller has been the standard equipment of the Swiss Air Force for a number of years. This propeller was designed from the start for eventual use as a brake and thus incorporated the necessary pitch range (about 70°).

The adaptation to actual braking during landing has however only been carried out comparatively recently. According to official tests on a standard single-seater fighter of the Swiss Air Force, the following average results were obtained (percentage basis):—

Run out	with no brakes	100
,,	with wheel brakes alone	61
,,	with propeller brake alone ...	28
,,	with combined wheel	17

The propeller brake thus reduces the run out length to less than one-third of the normal distance required with wheel brakes only. Since, moreover, the propeller brake becomes more efficient at high touch-down speeds, the run-out no longer increases as V^2 as it would do if only wheel brakes were utilised. If the old run out length is thus retained, it should be possible to increase the existing wind loading of aircraft very considerably and this represents, according to the author, the most important immediate development.

Although, as already stated, the original field of application of the propeller brake was thought to be speed limitation during a dive, interest in this development has somewhat faded since satisfactory aerodynamic brakes are now available as an alternative solution for this purpose. This, however, does not imply that the present rate of change of pitch of about 20°/sec. represents the limit of the Escher-Wyss design, which is still in progress of development.

The Take-off of Heavily Loaded Aircraft. (H. L. Studer and F. Widmer, Flugwehr und Technik, Vol. 5, 1943, pp. 48-51 and 75-77.) (116/8 Switzerland.)

As is well known, the length of take-off run for heavily loaded aircraft presents serious difficulties, whilst the actual landing, especially if propeller air brakes are fitted can be carried out in much shorter distances. This renders the lay-out of the aerodrome uneconomical and focuses attention on any means by which the take-off run can be shortened.

Now the take-off run consists of two distinct parts:—

1. Accelerated ground run till the aircraft becomes airborne (unstick).
2. Accelerated climb to an altitude of 20 m. followed by steady climb.

It is relatively easy to obtain an expression for the ground run (unsticking) provided certain simplifying assumptions are made, such as

(*a*) Constant angle of incidence.
(*b*) Linear decrease of static propeller thrust with increase in dynamic head.
(*c*) Constant coefficient of friction.

For the case of take-off from a horizontal surface, the distance d for unsticking is given by

$$d = \frac{m}{\rho F\,(k/F - C_D + \mu C_L)} \log \left\{ 1 + V_T^2 \frac{\rho F\,(k/F - C_D + \mu C_L)}{2m\,(S_o/m - \mu g)} \right\} \quad . \quad (1)$$

where m = mass of aircraft.
F = wing area.
μ = coefficient of friction.
S_o = static propeller thrust.
$S = d°$ at dynamic pressure q.
$= S_o + k \cdot q$.
V_T = minimum airborne speed.

For a given aircraft, therefore, d becomes a minimum if $\mu C_L - C_D$ is a maximum and this determines the incidence required for shortest unstick.

From the envelope polar diagram of the aircraft (taking into account flap deflection, ground effect and air drag of undercarriage) $\mu C_L - C_D$ can be plotted against C_L with μ as parameter and the optimum value of C_L determined.

In the case of a special aircraft considered by the author the following values were obtained:—

C_L opt.	μ	Weight of Aircraft.	10 tons.
.5	.05	F	55 m.2
.9	.10	N	4,000 h.p.
1.4	.15	—	
1.75	.20	—	

These optimum values are relatively low provided $\mu < .15$. Moreover, C_L opt. is considerably smaller than the max. C_L obtainable with this aircraft.

C_L max.	C_D	Flap deflection.	Aileron (acting as additional flap).
1.4	.15	0°	0°
1.8	.22	20°	7°
2.25	.33	45°	15°

It thus appears that large incidence or flap operation on smooth runways is definitely harmful as regards unstick distance, the increase in lift being more than balanced by the accompanying increase in drag, thus causing a decrease in $(\mu C_L - C_D)$.

(If it were possible to increase C_L without spoiling the lift-drag ratio, *e.g.*, by boundary layer suction, the unstick distance could be considerably reduced.)

In the above calculations, constancy of C_L during the ground run is assumed, the actual unsticking taking place at the same incidence. Since, however, the aircraft has a considerable lift reserve, the unstick distance could be reduced by accelerating at C_L opt. only until the dynamic pressure corresponding to C_L max. is reached, and altering the incidence suddenly at this point so as to obtain maximum lift. In this way the unstick run given by equation (1) can be reduced by about 10-15 per cent., leading to the following values for the particular aircraft considered.

μ	Unstick distance (m.)
0.0	210
.1	280
.2	360

To this distance must be added the ground distance corresponding to a climb to 20 m. The first part of this climb would be carried out under accelerated conditions and the shortest ground distance corresponds to steady climb conditions being reached at 20 m. altitude. For the particular aircraft considered, the author estimates an optimum distance of 185 m. for this purpose, the total starting distance thus ranging from 390 to 540 m., depending on state of surface of aerodrome. It should be emphasised that these are optimum figures and are liable to an increase of at least 100 m. by relatively slight departures from the best take-off technique.

As already stated, a marked reduction of these distances by purely aerodynamic means (*i.e.*, by design features incorporated in the aircraft) appears possible if boundary layer control by suction could be adopted.

As experiments in this direction have not yet led to a practical solution, the author briefly reviews other possible aids for take-off such as:—

1. Temporary Increase of Engine Power by Boost Considerably Above Present-Day Limits.

This requires special fuels, supplementary engine cooling by means of a fan, and a possible redesign of the engine. Although promising, this method entails considerable development work.

2. Catapult Starts.

Lack of mobility of equipment is the main drawback.

3. Rocket Starts.

This has proved of considerable help, provided the equipment can be jettisoned after take-off. The author states, however, that the fuel consumption of such devices is heavy and their utilisation not free from fire risk.

4. Take-off from an Inclined Surface.

If the aircraft is moving down an inclined plane, the propeller thrust is added by the weight component and the distance d for unsticking becomes:—

$$d=\frac{m}{\rho F\,(k/F-C_D+\mu C_L)}\times\log\left[\frac{S_0/mg-\mu\cos\gamma+\sin\gamma+\frac{\frac{1}{2}\rho V_T^2}{mg/F}(k/F-C_D+\mu C_L)}{S_0/mg-\mu\cos\gamma+\sin\gamma}\right] \quad (2)$$

where γ = slope of surface, the other factors having the same significance as in equation (1).

It appears that a slope as small as 20° is already sufficient to reduce the unstick distance by more than 50 per cent. The saving in aerodrome space is however nothing like as much, since the aircraft will leave the slope tangentially and continue to lose height over a considerable distance before the climb is finally started. Thus, for the particular aircraft considered, $\mu=.1$, normal unstick distance 280 m., the distance is reduced to about 120 m. for a slope of 20°. The lowest part of the subsequent flight trajectory occurs, however, at about a distance of 300 m. from the starting point. At this point the aircraft is flying horizontally for the moment and about 75 m. below the level of the starting point. A further horizontal distance of about 100 m. is required before the 20 m. obstacle can be cleared.

The total horizontal distance is thus of the order of 400 m. against 405 for the normal start. Even with a 60° slope, the horizontal distance is still 325 m. It is obvious that in this method, the advantage of the short-unstick run on the inclined plane is largely lost by the very flat subsequent flight trajectory.

An obvious solution of this difficulty would be to provide the aircraft with a concave contacting surface as soon as it leaves the inclined plane. By rolling along this surface, the aircraft assumes the horizontal position in a shorter distance than is possible under free flight conditions. Similarly the flat inclined surface would be provided with a preliminary convex entry so as to provide extra acceleration.

The accelerated motion of the aircraft under the combined action of propeller thrust and gravity when rolling over a surface of radius of curvature R is governed by the equation.

$$\frac{m}{2}\,\frac{d\,(V^2)}{ds}=S+mg\sin\gamma-W_R-W \quad . \quad . \quad . \quad . \quad (3)$$

where W_R = friction force on ground.

$$=\mu\{\,mg\cos\gamma\pm mV^2/R-C_aqF\,\}\,.$$

W = air drag $=C_Dq F$.

$q=\frac{1}{2}\rho V^2$.

The other symbols have the same significance as in equation (1).

Equation (3) is easily solved if R = constant (circular arc). In the case of the exit arc ($\gamma=0$ at exit) we then have a relationship between the slope γ and the velocity V_e at entry in order to produce the unstick velocity V_T at exit for a given radius of curvature R_2. Similarly, for the entry arc with horizontal entry at zero speed, we obtain a connection between the velocity and slope at the end of the arc for a given radius of curvature R_1. Both R_2 and R_1 are chosen as small as possible, the final limits being propeller ground clearance and unsticking under centrifugal force respectively. Naturally, if laid out in hilly country both R_1 and R_2 would also be chosen to approximate to available contours as closely as possible. If the slope of the flat portion of the runway has been settled, this must equal both the exit slope of the convex entry and the entry slope of the

concave exit. The length of flat runway required to produce the necessary acceleration then follows as a special case of (3).

The author has carried out a number of calculations for such S shaped runways for the particular aircraft in question, with the following results ($\mu = .1$):—

Slope of flat portion.	Total length (m.)	Max. height (m.)
10°	185	30 m.
20°	150	45 m.
30°	130	60 m.
60°	115	95 m.
90°	110	130 m.
0°	280	0

With a main slope of 20° therefore, the total take-off distance (unstick + climb to 20 m.) becomes 150 + 185 m. = 335 m. against 400 m. for a flat inclined plane and 465 m. for the level start.

It will be noted that slopes in excess of about 20° unless they are naturally available, scarcely justify the additional expenditure. Whilst the S shaped 20° slope has slightly increased the horizontal unstick distance compared with the flat slope of equal inclination (150 m. against 130 m.), the aircraft is now ready to climb, whilst in the latter case change over to climb in the free trajectory required a further 150 m. of horizontal travel. Moreover, the total loss in height with the S shaped take-off surface is only 45 m. against 75 m. with the flat inclined plane.

In the author's opinion, runways of the type considered are well worthy of consideration especially in hilly country such as Switzerland.

The Effectiveness of the Propeller as a Landing Brake. (A. v. der Muhll, Flugwehr und Technik, Vol. 5, No. 8, August, 1943, pp. 211-217.) (116/9 Switzerland.)

The author assumes that at the moment of touch-down, the propeller is switched over to negative thrust at full throttle and maintained at this setting till the aircraft comes to rest. During the run out, the thrust will diminish from the value corresponding to touch-down speed to the final static value (aircraft at rest). Over this range, the mean propeller braking force can be taken with sufficient accuracy as the average of these limiting values as given on the propeller thrust characteristic. For a 1,000 h.p. engine, a mean braking force of the order of 750 kg. is easily obtained. By substituting mean values for the air drag and ground friction, the length of run out e follows from the equation

$$\frac{M}{2} V_L^2 = e\,(W_m + R_m + S_m)$$

M = mass of aircraft.
V_L = touch-down speed.
W_m = mean value of air drag
R_m = ,, ,, ground friction
S_m = ,, ,, negative thrust
} during run out.

Substituting the corresponding non-dimensional coefficients the author obtains the following expression for e:—

$$e = \frac{G/F}{g\rho/2\left[C_{Dr} + \mu\left(2C_{Lt} - C_{Lr}\frac{F-f}{F}\right) + \frac{S_1+S_2}{\rho/2 \cdot V_T^2 F}\right]}$$

where G = weight of aircraft.
F = wing area.
C_{Dr} = drag coefficient during rolling at rolling incidence.
C_{Lt} = lift coefficient at touch down incidence.
C_{Lr} = ,, ,, rolling incidence.

f = wing area under negative slip stream and therefore without lift.
S_1 = negative thrust at touch down.
S_2 = static negative thrust.
V_T = touch down speed.
μ = coefficient of ground friction.

It will be noted that the use of the propeller as a landing brake reacts favourably on the operation of the wheel brakes, since the reversed slip stream destroys the lift over a considerable proportion of the wing surface (~ 50 per cent.) and thus increases the ground reaction.

By substituting mean values for the actual resistance forces, the calculation is very much simplified without serious loss in accuracy. Thus the direct measurements on landing runs with propeller brakes agree within 5 per cent. of the theoretical predictions. The following calculated results were obtained :—

Aircraft Type.	Touchdown Speed (km /h.)	Run-out Length (m.) No Brakes.	Wheel Brakes only.	Prop. only.	Wheel and Prop.
A	121	535 (800)	277 (467)	146 (195)	108 (154)
B	126	438 (602)	258 (398)	136 (176)	83 (118)
C	126	506 (673)	149 (235)	146 (194)	81 (115)
D	184	927 (1270)	547 (842)	218 (278)	147 (203)
E	184	1073 (1425)	316 (498)	231 (298)	144 (198)

The figures in brackets give the corresponding runs when landing at 20 per cent. excess speed.

Hard grass level surface

μ = .3 for standard undercarriage, wheel brakes only.
= .4 ,, ,, wheel and propeller brake.
= .45 tricycle undercarriage.

Particulars of the aircraft utilised are given below :—

	A	B	C	D	E
		Low Wing Monoplane.			
Aircraft Type.	Biplane Fixed Tail Wheel.	Tail Wheel. Retractable.	Nose Wheel. Retractable.	Tail Wheel Retractable.	Nose Wheel Retractable.
G (kg.)	2700	2600	2600	2600	2600
F (m.^{2})	32	18	18	8.5	8.5
f/F (per cent.) ...	40	50	50	50	50
H.P.	850	1000	1000	1000	1000
Diam. prop. (m.)...	3.25	3.10	3.10	3.10	3.10
Number of blades...	3	3	3	4	4

Types C and D are fitted with tricycle undercarriages.
Types D and E are high speed models.

It will be noted that the run-out with the propeller as the only brake is always considerably less than if the wheel brakes only are operated (in some cases less than half). With combined wheel and propeller brake the run-out length is still further reduced and for type D amounts to almost one quarter the distance for wheel brakes only.

A further advantage of the propeller brake is the fact that it counteracts the tendency of the standard undercarriage to nosing over. Moreover, by reversing the pitch already during the approach glide, the angle of the latter can be controlled at will by simply opening the throttle.

The results show that even at 20 per cent. excess landing speed, the run-outs with the propeller brake are appreciably less than those corresponding to standard touch down speed and wheel brakes only. It will thus be possible to increase the wing loading of future aircraft very considerably and thus obtain higher maximum speeds for the same engine power.

The Influence of Reynolds Numbers at High Mach Numbers. (A. Ferri, Atti di Guidonia, No. 67-69.) (Luftwissen, Vol. 10, No. 3, March, 1943, pp. 90-91.) (116/10 Italy.)

The experiments were carried out in the high speed wind tunnel at Guidonia on three brass spheres of 40, 60 and 80 mm. diameter supported on a rear spindle and on two steel cylinders of 15 and 30 mm. diameter respectively which passed through the air jet. Both the total drag and pressure difference between the front stagnation point and a variable point at the rear were measured. The pressure distribution on similar models which could be rotated and which were provided with suitable holes was also determined. The following results were obtained:—

Re $20-80\times10^4$.

RESISTANCE OF SPHERES.

For $M=.8$ and .9, the resistance coefficient is constant over the whole Re range, amounting to .325 and .340 respectively.

At $M=.7$ there is a small diminution of C_D with Re, the coefficient decreasing from $C_D=.3$ ($Re=20\times10^4$) to $C_D=.28$ at $Re=70\times10^4$.

At Mach numbers between $M=.3$ and $M=.67$, C_D diminishes at first slowly with increase in Re. At a certain critical Re, C_D falls very rapidly to about one third to one quarter of its original value and then undergoes a slight subsequent rise.

The results are given in the accompanying table and generally confirmed by pressure measurements and striation photographs of the flow.

It appears that the critical drag at low Mach numbers (up to $\sim .6$) is mainly due to the frontal dynamic head, the rear of the sphere being practically at static pressure (adhesion of flow). At higher Mach numbers, however, a lateral shock wave is set up leading to a region of considerable negative pressure over the rear surface of the sphere and accounting for the increase in drag observed.

It is clear that under these conditions the sphere can no longer be used as a turbulence indicator.

It should be emphasised that the results primarily apply to spheres and cylinders and that for aerofoils, the C_D value at $M > .7$ is likely to be affected by Re (thickness of boundary layer).

RESULTS ON SPHERES.

	C_D Mach Numbers.						
$Re\times10^4$	.3	.4	.5	.6	.67	.7	.8
20	.245	.250	.257	.270	.280	.30	.325
30	.237	.245	.255	.260	.270	.30	Constant
40	.180	.220	.240	.250	.260	.30	
45	.060	.07	.220	.240	.250	.297	
50	—	.06	.190	.230	.240	.296	
55	—	.07	.075	.215	.230	.292	
60	—	.075	.070	.190	.220	.290	
65	—	—	.080	.095	.205	.287	
70	—	—	.090	.080	.185	.280	
75	—	—	.095	.090	.140	—	
80	—	—	—	—	.100	—	
85	—	—	—	—	.110	—	.325

LIST OF SELECTED TRANSLATIONS.

No. 62.

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TRANSLATION NUMBER AND AUTHOR.	TITLE AND REFERENCE.
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1330 Stemmer, J. ...	*The Development of Jet or Rocket Propulsion.* (Flugwehr und Technik, Vol. 3, No. 7 and No. 8, July-Aug., 1941, pp. 166-170 and 191-195.)
1902 Nevzorov, J. J. ...	*Distribution of Aerodynamic Load on the Tail Surfaces of an Aircraft.* (Trans. C.A.H.I., No. 477, 1940.)
1903 Euler, H.	*Shock Losses and Resistance Loss Coefficient in Pipe Lines and Conduits.* (Archiv. f. das Eisen, No. 11, May, 1934, pp. 430-438.)
1904 Pinl, M.	*On the Theory of Compressible Flow — III.* (Z.A.M.M., Vol. 22, No. 6, Dec., 1942, pp. 305-311.)
1905 Oswatitsch, K. ...	*Condensation Phenomena in Supersonic Nozzles.* (Z.A.M.M., Vol. 22, No. 1, Feb., 1942, pp. 1-14.)
	AIRCRAFT AND ACCESSORIES.
1899 Lundberg, B. O. ...	*A General Description of the J-22 (Swedish) Aeroplane.* (By the Chief Designer.)
1901 ——	*Jettisonable Auxiliary Wing for Facilitating Take-off.* (*German Patent* 719,857.) (Flugsport, Vol. 34, No. 12, 10/6/42, p. 121.)
1906 Ruhlemann, E. ...	*The Development of Technical Equipment in Aircraft.* (Luftwissen, Vol. 10, No. 2, March, 1943, pp. 83-85.)
1910 Ebner, H.	*Problems Appertaining to Marine Aircraft.* (Luftwissen, Vol. 9, No. 5, May, 1942, pp. 142-154.)
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1912 Jenckel, E.	*Systematics of Mixed Polymers.* (Z. Phys. Chemie., Vol. 190, No. 1, Nov., 1941, pp. 24-42.)

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		WIRELESS AND ELECTRICITY.
1894	Pintsch, J.	*Automatic Landing Direction Indicator for Aerodromes. (German Patent* 728,094.) (Flugsport, Vol. 35, No. 3, 3/3/43, p. 195.)
1897	Ponomarev, L. I. ...	*Comparison of Electrical and Mechanical Relaxation Times.* (J. Tech. Phys., U.S.S.R., Vol. 10, No. 7, 1940, pp. 587-598.)
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1909	Kusters, W. ...	*Measurements of the Dielectric Properties of Ceramic Insulating Materials with Centimetre Waves.* (H.F.T., Vol. 59, No. 5, May, 1942.)
1917	——	*Wireless Beacon Array for Guiding Aircraft on a Given Path. (German Patent* 712,030.) (Flugsport, Vol. 34, No. 7, 1/4/42, p. 108.)
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1891	——	*Sound-Proofed Shooting Range.* (Z.V.D.I., Vol. 86, No. 49-50, Dec., 1942, p. 748.)
1914	Collatz	*A Natural Interval for the Numerical Integration of Systems of Linear Differential Equations.* (Z.A.M.M., Vol. 22, No. 4, August, 1942, pp. 216-225.)

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2	12448	G.B. and U.S.A. ...	*Allied Moves in the Pacific.* (Aeroplane, Vol. 65, No. 1,676, 9/7/43, pp. 34-36.)
3	12460	Germany ...	*The Battle for Kerch.* (G. Soldan, Coast Artillery Jnl., Vol. 86, No. 2, March-April, 1943, pp. 40-44.)
4	12501	U.S.A. ...	*Problems of Global Air War.* (N. F. Silsbee, Mech. Eng., Vol. 65, No. 5, May, 1943, pp. 313-320.)
5	12550	U.S.A. ...	*Proposal to Use Gliders for Anti-Submarine Work.* (American Aviation, Vol. 6, No. 22, 15/4/43, p. 22.)
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8	12609	U.S.A. ...	*Army Air Forces School of Applied Tactics.* (American Aviation, Vol. 7, No. 1, 1/6/43, pp. 28-29.)
9	12616	U.S.A. ...	*Details of Tokyo Raid.* (American Aviation, Vol. 6, No. 23, 1/5/43, pp. 26, 32-34.)
10	12626	U.S.A. ...	*Daylight Bombing.* (American Aviation, Vol. 6, No. 24, 15/5/43, p. 22.)
11	12998	U.S.A. ...	*Helicopter Planes Work as Anti-Submarine Weapon.* (Aero Digest, Vol. 42, No. 6, June, 1943, pp. 311, 341.)
12	13113	U.S.A. ...	*Germany Can be Bombed Out of the War.* (P. Masefield, American Aviation, Vol. 7, No. 4, 15/7/43, pp. 31-38.)
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19	12557	U.S.A. ...	*Ordnance Field Service—Connecting Link Between Producer and Soldier.* (J. S. Hatcher, S.A.E. Journal, Vol. 51, No. 1, July, 1943, pp. 24-25, 51-52.)
20	12594	G.B.	*R.A.F. Elementary Flying Training Schools.* (Canadian Aviation, Vol. 16, No. 3, March, 1943, pp. 74-78, 88.)
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22	12754	U.S.A. ...	*Naval Aviation Flying Cadets' Schools.* (J. B. Goodman, U.S. Air Services, Vol. 28, No. 5, May, 1943, pp. 14-15, 52.)
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28	12497	Canada	... *Aircraft Electrical Systems.* (R. P. Bell, Canadian Aviation, Vol. 16, No. 4, April, 1943, pp. 96, 102-104.)
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30	12535	U.S.A.	... *Jettison Tanks for Lockheed Lightning.* (Aircraft Prod., Vol. 5, No. 57, July, 1943, pp. 333-337.)
31	12553	U.S.A.	... *Multi-Purpose Aircraft Design Utilising a Detachable Fuselage (Deysher-Hutts Plane).* (American Aviation, Vol. 6, No. 22, 15/4/43, pp. 46-54.)
32	12627	U.S.A.	... *New Development in Helicopter Construction and Design.* (American Aviation, Vol. 6, No. 24, 15/5/43, pp. 16, 28.)
33	12598	U.S.A.	... *Problems in Aircraft Structional Research.* (F. R. Shanley, published in full in Aircraft Engineering, July, 1943, pp. 200-206, A.S.M.E. Preprint, June, 1943.)
34	12692	U.S.A.	... *New War Planes of Wood and Plastics.* (Modern Plastics, Vol. 20, No. 7, March, 1943, pp. 61-69.)
35	12791	U.S.A.	... *Automatic Pilot Seat to Reduce Pilot's "Blackout" (Recumbent Position Obtained Automatically with Release of Bomb).* (S. R. Winters, Flying and Industrial Aviation, Vol. 32, No. 4, April, 1943, pp. 87-90.)
36	12850	U.S.A.	... *Aircraft Interphone.* (Automotive Industries, Vol. 89, No. 2, 15/7/43, p. 44.)
37	12883	U.S.A.	... *Problems in the Use of Plywood in Aeroplane Construction.* (A. Klemin, Engineers' Digest, Vol. 4, No. 4, April, 1943, pp. 99-101.)
38	13026	G.B. ...	... *Trends of British Bomber Design.* (J. I. Waddington, Aero Digest, Vol. 42, No. 4, April, 1943, pp. 223-227, 416.)
39	13060	Canada	... *Moulded Plywood Anson V.* (Aircraft Production, Vol. 5, No. 54, April, 1943, p. 202.)
40	13107	U.S.A.	... *Problems in Aircraft Structural Research.* (F. R. Shanley, Engineers' Digest, Vol. 4, No. 5, May, 1943, pp. 145-151.)
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45	12869	G.B.	*Atlantic Record Flights.* (Times Trade and Engineering, Vol. 53, No. 952, June, 1943, p. 34.)
			Equipment and Maintenance of Military Aircraft.
46	12439	G.B.	*Front Line Repairs (Photograph).* (Aeroplane, Vol. 65, No. 1,678, 23/7/43, p. 103.)
47	12481	G.B.	*New British Safety Measures at Sea.* (Petroleum Times, Vol. 47, No. 1,198, 26/6/43, pp. 312-315, 327-328.)
48	12500	Canada ...	*The Lindholme Sea Rescue Gear.* (Canadian Aviation, Vol. 16, No. 4, April, 1943, p. 148.)
49	12551	U.S.A. ...	*A.A.F. Life-Saving Raft (Photograph).* (American Aviation, Vol. 6, No. 22, 15/4/43, p. 26.)
50	12559	Germany ...	*Captured Enemy Equipment (Guns, etc.).* (S.A.E. Journal, Vol. 51, No. 1, July, 1943, pp. 29-32.)
51	12596	Canada ...	*Carrier-Based Fighters Equipped with Life-Saving Raft Released Automatically.* (Canadian Aviation, Vol. 16, No. 3, March, 1943, p. 120.)
52	12606	U.S.A. ...	*Prefabricated Arch Type Hangar Can be Transported by Air.* (American Aviation, Vol. 7, No. 1, 1/6/43, p. 19.)
53	12795	U.S.A. ...	*Life Raft Automatically Launched when Plane Strikes Water (New Patent).* (Flying and Industrial Aviation, Vol. 32, No. 4, April, 1943, p. 115.)
54	12619	U.S.A. ...	*Portable Starting Unit for Planes.* (American Aviation, Vol. 6, No. 23, 1/5/43, p. 53.)
55	12796	U.S.A. ...	*New Lifeboat for Airmen.* (Flying and Industrial Aviation, Vol. 32, No. 4, April, 1943, p. 128.)
56	12797	U.S.A. ...	*Portable Shelter for Air Force Personnel in Arctic Climates.* (Flying and Industrial Aviation, Vol. 32, No. 4, April, 1943, p. 132.)
57	12857	U.S.A. ...	*New Synthetic Rubber Boat to Protect Landing Gear Equipment.* (Automotive Industries, Vol. 89, No. 2, 15/7/43, p. 86.)
58	12992	U.S.A. ...	*Airborne Front Line Hangar.* (W. B. Larkin, Aero Digest, Vol. 42, No. 6, June, 1943, pp. 243, 330-331.)
59	12994	U.S.A. ...	*Concrete Fuel Tanks Lined Synthetic Rubber.* (Aero Digest, Vol. 42, No. 6, June, 1943, pp. 266-269.)

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60	13037	U.S.A. ...	*Portable Parachute Servicing Table.* (Aero Digest, Vol. 42, No. 4, April, 1943, p. 360.)
			Armament and Maintenance of Military Aircraft.
61	12454	U.S.A. ...	*Armour Attack and Fire Effect.* (Coast Artillery Jnl., Vol. 86, No. 2, March-April, 1943, pp. 5-10.)
62	12464	U.S.A. ...	*Range Ballistic Corrections for Three-inch Guns.* (R. E. Baker, Coast Artillery Jnl., Vol. 86, No. 2, March-April, 1943, p. 60.)
63	12496	U.S.A. ...	*Fire Power of the Airacobra (Program).* (Canadian Aviation, Vol. 16, No. 4, April, 1943, p. 94.)
64	12588	U.S.A. ...	*Development of American Bomb Sight.* (Skyways, Vol. 2, No. 3, March, 1943, pp. 42-43, 82.)
65	12745	U.S.A. ...	*Bell Machine Gun Adapter (Recoil Absorption Device).* (American Aviation, Vol. 7, No. 2, 15/6/43, p. 60.)
66	12831	U.S.A. ...	*Cyclonite—New Explosive for Bombs and Shells.* (Industrial Eng. Chemistry, Vol. 21, No. 13, 10/7/43, p. 1,119.)
67	12846	U.S.A. ...	*Comparative Aircraft Armament Fire Power.* (Automotive Industries, Vol. 89, No. 2, 15/7/43, p. 31.)
			Military Types of Aircraft (G.B.).
68	12356	G.B.	*Vickers' Spitfire IX (Silhouette).* (Inter. Avia., No. 871, 1, 26/5/43.)
69	12443	G.B.	*The Typhoon as a Bomber (Photograph).* (Aeroplane, Vol. 65, No. 1,676, 9/7/43, pp. 44-45.)
70	12494	G.B.	*British, Canadian and U.S. Military Aeroplane Specifications.* (Canadian Aviation, Vol. 16, No. 4, April, 1943, pp. 56-57.)
71	12502	G.B.	*Spitfire IX (Photograph).* (Mech. Eng., Vol. 65, No. 5, May, 1943, p. 319.)
72	12587	G.B.	*British Fighters and Bombers (Photograph).* (Skyways, Vol. 2, No. 3, March, 1943, pp. 49-63.)
73	12591	Canada ...	*Anson V (Photograph).* (Canadian Aviation, Vol. 16, No. 3, March, 1943, pp. 52-53, 88.)
74	12646	G.B.	*Bristol Beaufighter Torpedo Bomber.* (Inter. Avia., No. 865-866, 17/4/43, p. 16.)
75	12781	G.B.	*D.H. "Mosquito" (Recognition Details).* (Flying and Industrial Aviation, Vol. 32, No. 4, April, 1943, p. 56.)
76	12855	G.B.	*New Halifax Heavy Bomber.* (Automotive Industries, Vol. 89, No. 2, 15/7/43, p. 80.)
77	12868	G.B.	*Hawker Typhoon.* (Times Trade and Engineering, Vol. 53, No. 952, June, 1943, p. 33.)
78	12870	G.B.	*D.H. Mosquito.* (Times Trade and Engineering, Vol. 53, No. 952, June, 1943, p. 35.)
79	12990	G.B.	*The De Havilland "Mosquito."* (Aero Digest, Vol. 42, No. 6, June, 1943, pp. 227-232, 340-341.)
80	13061	G.B.	*The Mosquito IV Produced in Canada (Full Details).* (Canadian Aviation, Vol. 16, No. 6, June, 1943, pp. 79-86, 99-102, 116-117.)
81	13072	G.B.	*The D.H. Mosquito.* (M. W. Bourdon, Automotive Industries, Vol. 88, No. 12, 15/6/43, pp. 26-30, 89-90.)

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82	13078	G.B.	...	*The Hawker Typhoon.* (Automotive Industries, Vol. 88, No. 12, 15/6/43, pp. 41, 90.)
83	13095	G.B.	...	*Halifax Mark II, Series 1A.* (Times Trade and Engg., Vol. 53, No. 953, July, 1943, p. 36.)
				Military Types of Aircraft (U.S.A.).
84	12355	U.S.A.	...	*Vought F4U-2 "Corsair" Naval Fighter.* (Inter. Avia., No. 871, 26/5/43, p. 15.)
85	12391	U.S.A.	...	*Consolidated Liberator II.* (Flugsport, Vol. 35, No. 11, 14/7/43, p. 151.)
86	12428	U.S.A.	...	*North American B.2S. Mitchell (Photograph).* (Aeroplane, Vol. 65, No. 1,678, 23/7/43, p. 88.)
87	12429	U.S.A.	...	*North American Mustang (Photograph).* (Aeroplane, Vol. 65, No. 1,678, 23/7/43, p. 89.)
88	12430	U.S.A.	...	*The Martin PBM-3 Mariner (Photograph).* (Aeroplane, Vol. 65, No. 1,678, 23/7/43, p. 90.)
89	12434	U.S.A.	...	*Vought SB2U-2 Vindicator Carrier-Borne Dive Bomber (Photograph).* (Aeroplane, Vol. 65, No. 1,678, 23/7/43, p. 100.)
90	12435	U.S.A.	...	*Douglas SBD-3 Dauntless Light Bomber (Photograph).* (Aeroplane, Vol. 65, No. 1,678, 23/7/43, p. 101.)
91	12436	U.S.A.	...	*Brewster SB2A-1 Buccaneer Dive Bomber (Photograph).* (Aeroplane, Vol. 65, No. 1,678, 23/7/43, p. 101.)
92	12437	U.S.A.	...	*Boeing N2S2 Cadet Training Biplane (Photograph).* (Aeroplane, Vol. 65, No. 1,678, 23/7/43, p. 101.)
93	12441	U.S.A.	...	*Two Motor High Wing Transport—the Cessna Loadmaster.* (Aeroplane, Vol. 65, No. 1,678, 23/7/43, p. 110.)
94	12442	U.S.A.	...	*The "Liberator Commando."* (Aeroplane, Vol. 65, No. 1,678, 23/7/43, p. 110.)
95	12445	U.S.A.	...	*The Lockheed Lightning (Photograph).* (Aeroplane, Vol. 65, No. 1,676, 9/7/43, p. 40.)
96	12470	U.S.A.	...	*Popular Names for U.S. Military Aircraft.* (Coast Artillery Jnl., Vol. 86, No. 1, Jan.-Feb., 1943, p. 69.)
97	12492	U.S.A.	...	*The Noorduyn Norseman.* (Canadian Aviation, Vol. 16, No. 4, April, 1943, pp. 52-53.)
98	12495	U.S.A. and G.B.	...	*Types of Aircraft Currently Used by American, Canadian and British Air Forces.* (Canadian Aviation, Vol. 16, No. 4, April, 1943, pp. 58-92.)
99	12503	U.S.A.	...	*Douglas A-20 Havocs (Photograph).* (Mech. Eng., Vol. 65, No. 5, May, 1943, p. 317.)
100	12522	U.S.A.	...	*Curtiss "Caravan."* (Commercial Aviation, Vol. 5, No. 4, April, 1943, pp. 94-102.)
101	12589	U.S.A.	...	*Curtiss-Wright "Caravan" Transport.* (Skyways, Vol. 2, No. 3, March, 1943, pp. 73-75.)
102	12593	U.S.A.	...	*Lockheed "Constellation."* (Canadian Aviation, Vol. 16, No. 3, March, 1943, p. 56.)
103	12602	U.S.A.	...	*The New Vega PV-1 (Photograph).* (U.S. Air Services, Vol. 28, No. 4, April, 1943, p. 12.)

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104	12603	U.S.A. ...	*The Martin B-26 Marauder (Photograph).* (E. H. Forbes, U.S. Air Services, Vol. 28, No. 4, April, 1943, pp. 18-20.)
105	12607	U.S.A. and G.B. ...	*American and British Planes in the War News (Photos).* (American Aviation, Vol. 7, No. 1, 1/6/43, p. 22.)
106	12608	U.S.A. ...	*Cessna "Loadmaster" Steel Plywood Plane for Military Cargo.* (American Aviation, Vol. 7, No. 1, 1/6/43, p. 25.)
107	12622	U.S.A. ...	*New Navy Fighter—The Brewster F3A (Photograph).* (American Aviation, Vol. 6, No. 24, 15/5/43, p. 14.)
108	12629	U.S.A. ...	*United Air Lines Army Plane (Consolidated Cargo Transport) (Photograph).* (American Aviation, Vol. 6, No. 24, 15/5/43, p. 45.)
109	12632	U.S.A. ...	*North American Dive Bomber Version of Mustang Fighter (A-36) (Photograph).* (American Aviation, Vol. 6, No. 24, 15/5/43, p. 70.)
110	12644	U.S.A. ...	*Boeing B-17E/F.* (Inter. Avia., No. 865-866, 1, 17/4/43, pp.6-7.)
111	12645	U.S.A. ...	*Lockheed Ventura.* (Inter. Avia., No. 865-866, 1, 17/4/43, p. 7.)
112	12737	U.S.A. ...	*Brewster Buccaneer Dive Bomber (Photograph).* (American Aviation, Vol. 7, No. 2, 15/6/43, p. 16.)
113	12739	U.S.A. ...	*Vought Corsair and the Vega Ventura PV-1 (Photograph).* (American Aviation, Vol. 7, No. 2, 15/6/43, p. 25.)
114	12746	U.S.A. ...	*The Skyfarer.* (American Aviation, Vol. 7, No. 2, 15/6/43, p. 60.)
115	12749	U.S.A. ...	*The Martin Marauder B-26 as an All-Purpose War Plane.* (American Aviation, Vol. 7, No. 2, 15/6/43, p. 63.)
116	12752	U.S.A. ...	*Navy's Vought Corsair Plane.* (American Aviation, Vol. 7, No. 2, 15/6/43, p. 67.)
117	12755	U.S.A. ...	*Lockheed "Lightning" P-38 Carrying Two Droppable Fuel Tanks (Photograph).* (U.S. Air Services, Vol. 28, No. 5, May, 1943, pp. 16-17.)
118	12756	U.S.A. ...	*Navy's Latest Fighter—Brewster F.3.A. (Photograph).* (U.S. Air Services, Vol. 28, No. 5, May, 1943, p. 42.)
119	12757	U.S.A. ...	*Sikorsky Helicopter.* (Civil Aeronautics Journal, Vol. 4, No. 6, 15/6/43, pp. 76-77.)
120	12780	U.S.A. ...	*Curtiss "Commando" (Recognition Details).* (Flying and Industrial Aviation, Vol. 32, No. 4, April, 1943, p. 56.)
121	12787	U.S.A. ...	*Grumman "Wildcats" on Aircraft Carrier (Photo).* (Flying and Industrial Aviation, Vol. 32, No. 4, April, 1943, p. 65.)
122	12788	U.S.A. ...	*Navy HE. 1 Piper Aircraft Ambulance (Photo).* (Flying and Industrial Aviation, Vol. 32, No. 4, April, 1943, p. 66.)
123	12871	U.S.A. ...	*The U.S. Thunderbolt (P-47).* (Times Trade and Engineering, Vol. 53, No. 952, June, 1943, p. 36.)

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124	12878	U.S.A.	...	*New R.A.F. Types—The Lockheed, Vega, Ventura Medium Bomber.* (Aircraft Engineering, Vol. 15, No. 174, Aug., 1943, pp. 227-238.)
125	12982	U.S.A.	...	*The New Piper P.T. Trainer (Powered with Franklin Six-Cylinder Engine).* (Aero Digest, Vol. 42, No. 6, June, 1943, pp. 179-181, 331-332.)
126	12986	U.S.A.	...	*Lockheed "Lightning" High Altitude Fighter (Sectional Drawings).* (Aero Digest, Vol. 42, No. 6, June, 1943, pp. 202-203.)
127	13032	U.S.A.	...	*Boeing Strato Trainer.* (Aero Digest, Vol. 42, No. 4, April, 1943, pp. 258, 277.)
128	13034	U.S.A.	...	*North American A-36 Dive Bomber Version of Mustang (Photo).* (Aero Digest, Vol. 42, No. 4, April, 1943, p. 311.)
129	13057	U.S.A.	...	*Characteristics and Construction of the Lockheed Constellation Transport Plane.* (Aircraft Production, Vol. 5, No. 54, April, 1943, pp. 195-196.)
130	13062	U.S.A.	...	*C. 87 Liberator Express Transport (Photograph).* (Canadian Aviation, Vol. 16, No. 6, June, 1943, p. 92.)
131	13094	U.S.A.	..	*Vega Ventura Medium Bomber.* (Times Trade and Engg., Vol. 53, No. 953, July, 1943, p. 35.)
132	13115	U.S.A.	...	*Consolidated Vultee's New Flying Boat P4Y-1 (Photograph.* (American Aviation, Vol. 7, No. 4, 15/7/43, p. 60.)
				Military Types of Aircraft (U.S.S.R.).
133	12647	U.S.S.R.	...	*U.S.S.R. Bombers (PE-2, DB-3, DB-3F).* (Inter. Avia., No. 865-866, 1, 17/4/43, pp. 17-18.)
134	12782	U.S.S.R.	...	*Russian "Stormovik" (Recognition Details).* (Flying and Industrial Aviation, Vol. 32, No. 4, April, 1943, p. 57.)
135	12785	U.S.S.R.	...	*Russian Fighters (Photo).* (Flying and Industrial Aviation, Vol. 32, No. 4, April, 1943, p. 61.)
136	12790	U.S.S.R.	...	*Russian SU-2 Bomber (Photo).* (Flying and Industrial Aviation, Vol. 32, No. 4, April, 1943, p. 67.)
				Military Types of Aircraft (Germany).
137	12354	Germany	...	*Me. 110 with Extra Tanks (Photo).* (Inter. Avia., No. 871, 1, 26/5/43.)
138	12359	Germany	...	*Messerschmitt Me. 209 and 109G.* (Inter. Avia., No. 871, 26/5/43, p. 18.)
139	12390	Germany	...	*Messerschmitt Me. 109 and 110, with Technical Drawings.* (Flugsport, Vol. 35, No. 11, 14/7/43, pp. 142-149.)
140	12432	Germany	...	*Me. 109 (Photograph).* (Aeroplane, Vol. 65, No. 1,678, 23/7/43, p. 95.)
141	12446	Germany	...	*Captured Junkers Ju. 87D1 Dive Bomber (Photograph).* (Aeroplane, Vol. 65, No. 1,676, 9/7/43, p. 39.)
142	12447	Germany	...	*Dornier Do. 217 E2 (Photograph).* (Aeroplane, Vol. 65, No. 1,676, 9/7/43, p. 37.)
143	12452	Germany	...	*Me. 323 Six-Engine Transport (Photograph).* (Aeroplane, Vol. 65, No. 1,676, 9/7/43, p. 31.)

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144	12592	Germany ...	*Focke-Wulf F.W. 190 A3 (Detailed Drawing).* (Canadian Aviation, Vol. 16, No. 3, March, 1943, pp. 54-55.)
145	12783	Germany ...	*Dornier Do. 18K (Recognition Details).* (Flying and Industrial Aviation, Vol. 32, No. 4, April, 1943, p. 57.)
146	12786	Germany ...	*Ju. 87-D (Photo).* (Flying and Industrial Aviation, Vol. 32, No. 4, April, 1943, p. 63.)
147	13031	Germany ...	*Messerschmitt 323 Troop Transport.* (Aero Digest, Vol. 42, No. 4, April, 1943, p. 252.)
			Military Types of Aircraft (Japan).
148	12431	Japan ...	*Mitsubishi OB-01 Two-Motor Bomber (Photograph).* (Aeroplane, Vol. 65, No. 1,678, 23/7/43, p. 92.)
			Gliders.
149	12363	G.B.	*Nylon Tow Rope for Gliders.* (Plastics, Vol. 7, No. 75, August, 1943, p. 333.)
150	12438	G.B.	*Airspeed Horsa I Troop Carrying Glider (Photograph).* (Aeroplane, Vol. 65, No. 1,678, 23/7/43, p. 104.)
151	12449	Canada ...	*Waco CG-4A Glider Towed by Douglas Dakota (Montreal-Great Britain Historic Flights) (Photograph).* (Aeroplane, Vol. 65, No. 1,676, 9/7/43, p. 30.)
152	12450	U.S.A. ...	*U.S. Navy Amphibious Glider LRC-1 (Photograph).* (Aeroplane, Vol. 65, No. 1,676, 9/7/43, p. 30.)
153	12605	U.S.A. ...	*Twin-Engined CG-4A Glider (Detachable Engine).* (American Aviation, Vol. 7, No. 1, 1/6/43, p. 18.)
154	12651	U.S.A. ...	*New U.S.A. Transport Gliders (Waco CG 4 and 4A).* (Inter. Avia., No. 865-866, 1, 17/4/43, p. 28.)
155	12776	U.S.A. ...	*Glider Train.* (E. L. Howe, Flying and Industrial Aviation, Vol. 32, No. 4, April, 1943, pp. 40-42, 144.)
156	12789	U.S.A. ...	*The Bristol XLQ-1 U.S. Navy's Amphibious Glider (Photo).* (Flying and Industrial Aviation, Vol. 32, No. 4, April, 1943, p. 66.)
157	12980	U.S.A. ...	*New Troop Transport Glider Powered by Two Small Detachable Engines (North-Western C.G.-4a Troop Glider).* (Aero Digest, Vol. 42, No. 6, June, 1943, pp. 173, 334.)
158	13027	U.S.A. ...	*Taylorcraft T.G.6 Training Glider (Detailed Drawings).* (Aero Digest, Vol. 42, No. 4, April, 1943, pp. 228-229.)
			A.A. and Artillery, etc.
159	12455	U.S.A. ...	*Limited Area Defence (Aerodrome Defence).* (Coast Artillery Jnl., Vol. 86, No. 2, March-April, 1943, pp. 11-17.)
160	12456	U.S.S.R. ...	*The Dual Rôle of Anti-Aircraft Artillery.* (Klochko, Coast Artillery Jnl., Vol. 86, No. 2, March-April, 1943, pp. 18-19.)

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161	12457	U.S.A.	...	*Navy Anti-Aircraft Guns (Photograph).* (Coast Artillery Jnl., Vol. 86, No. 2, March-April, 1943, pp. 20-21.)
162	12458	U.S.A.	...	*Notes on A.A. Gunnery.* (E. E. Farnsworth, Coast Artillery Jnl., Vol. 86, No. 2, March-April, 1943, pp. 26-30.)
163	12459	Spain	...	*Casemating Sea Coast Artillery.* (L. S. Tembleque, Coast Artillery Jnl., Vol. 86, No. 2, March-April, 1943, pp. 36-39.)
164	12461	U.S.A.	...	*A.A. Artillery with the Field Forces.* (D. S. Ellerthorpe, Coast Artillery Jnl., Vol. 86, No. 2, March-April, 1943, pp. 45-49.)
165	12462	U.S.A.	...	*Searchlight Control Trainer.* (C. O. Smith, Coast Artillery Jnl., Vol. 86, No. 2, March-April, 1943, pp. 56-57.)
166	12463	U.S.A.	...	*40 mm. A.A. Gun Tower.* (O. R. Fitz and W. P. Moss, Coast Artillery Jnl., Vol. 86, No. 2, March-April, 1943, pp. 58-59.)
167	12465	U.S.S.R.	...	*Anti-Aircraft Mobility (including Photographs of Russian Gun Mounts).* (Desnitsky, Coast Artillery Jnl., Vol. 86, No. 1, Jan.-Feb., 1943, pp. 4-8.)
168	12466	G.B. ...	...	*Britain's A.A. Defences.* (P. J. Mackesy, Coast Artillery Jnl., Vol. 86, No. 1, Jan.-Feb., 1943, pp. 34-37.)
169	12467	Germany	...	*Enemy Anti-Tank and Tank Tactics.* (F. L. Lazarus, Coast Artillery Jnl., Vol. 86, No. 1, Jan.-Feb., 1943, pp. 38-41.)
170	12469	U.S.A.	...	*Anti-Aircraft Spotting Apparatus.* (D. L. Lewis, Coast Artillery Jnl., Vol. 86, No. 1, Jan.-Feb., 1943, pp. 54-56.)
171	12471	Germany	...	*German Six-Barrelled Trench Mortar Captured by the Russians (Believed to be Electrically-Fired Rocket Gun) (Photograph).* (Coast Artillery Jnl., Vol. 86, No. 1, Jan.-Feb., 1943, p. 71.)
172	12472	Germany	...	*German Siege Guns of the Two World Wars.* (W. Ley, Coast Artillery Jnl., Vol. 86, No. 1, Jan.-Feb., 1943, pp. 13-20.)
173	12473	U.S.A.	...	*Identification of Merchant Ships.* (K. L. Brown, Coast Artillery Jnl., Vol. 86, No. 1, Jan.-Feb., 1943, pp. 28-33.)
174	12597	Canada	...	*New A.R.P. Warning Device.* (Canadian Aviation, Vol. 16, No. 3, March, 1943, p. 120.)
175	12904	G.B. ...	...	*The Plastics Hand Grenade.* (L. J. Falkenhagen, British Plastics, Vol. 15, No. 171, Aug., 1943, pp. 130-132.)
176	12935	G.B. ...	...	*Manufacture of the Six-Pounder Anti-Tank Gun Carriage.* (Machinery, Vol. 62, No. 1,600, 10/6/43, pp. 617-622.)
177	12972	U.S.A.	...	*Hints on Effective Camouflage.* (J. D. Campbell, Aero Digest, Vol. 42, No. 6, June, 1943, pp. 116-117, 224, 327-328.)
178	13127	G.B. ...	...	*Six-Pounder Anti-Tank Gun Carriage, Machining Operations.* (Machinery, Vol. 62, No. 1,602, 24/6/43, pp. 673-678.)

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AERODYNAMICS AND HYDRODYNAMICS.

General Aerodynamics.

179	12479	G.B.	*On a New Theory of Free Turbulence.* (*R.T.P. Translation No.* 1,686.) (H. Reichart, Jnl. Roy. Aeron. Soc., Vol. 47, No. 390, June, 1943, pp. 167-176.)
180	12549	U.S.A. ...	*N.A.C.A.'s Research Programme.* (American Aviation, Vol. 6, No. 22, 15/4/43, p. 20.)
181	12583	U.S.A. ...	*Aerodynamic Performance of the Towed Glider.* (A. Klemin and W. C. Walling, Aero Sciences, Vol. 10, No. 6, June, 1943, pp. 185-196.)
182	12585	U.S.A. ...	*Notes on Three-Dimensional Wing Flutter Analysis.* (F. Nagel, Aero Sciences, Vol. 10, No. 6, June, 1943, p. 199.)
183	12778	U.S.A. ...	*Bird and Insect Flight.* (F. W. Lane, Flying and Industrial Aviation, Vol. 32, No. 4, April, 1943, pp. 46-48, 160-161.)
184	12799	G.B.	*The Representation of Aircraft Wings, Tails and Fuselage by Semi-Rigid Structure in Dynamic and Static Problems.* (W. J. Duncan, R.M., No. 1,904, 6/2/43, pp. 1-23.)
185	12873	G.B.	*An Airscrew Engine Analogy—Similarity Between the Forces Acting on the Two.* (T. H. Day, Aircraft Engineering, Vol. 15, No. 174, Aug., 1943, pp. 218-222.)
186	13100	U.S.A. ...	*Effect of Turbulence and Channel.* (G. H. Keulegan and G. W. Patterson, J. of Research National Bureau of Standards, Vol. 30, No. 6, June, 1943, pp. 461-512.)
187	13119	U.S.A. ...	*New American Wind Tunnel.* (American Aviation, Vol. 7, No. 4, 15/7/43, p. 58.)
188	13301	U.S.A. ...	*Southern California Co-operative Wind Tunnel* (*Speeds Approximating Sound*). (Scientific American, Vol. 169, No. 2, Aug., 1943, p. 75.)

Hydrodynamics.

189	12387	G.B.	*Steering Experiments* (*Contd.*) (*Ship's Rudder*). (R. W. L. Gawn, Engineer, Vol. 176, No. 4,570, 13/8/43, pp. 135-136.)
190	12416	G.B.	*Modern Liquid State Theory in Relation to Engineering.* (R. S. Silver, Engineering, Vol. 156, No. 4,047, 6/8/43, pp. 114-115.)
191	12877	G.B.	*Fluid Flow Through Restrictions* (*Discussion*). (Aircraft Engineering, Vol. 15, No. 174, Aug., 1943, p. 238.)
192	12921	G.B.	*Steering Experiments* (*Contd.*). (R. W. L. Gawn, Engineer, Vol. 176, No. 4,571, 20/8/43, pp. 145-147.)
193	13108	Switzerland ...	*Hydraulic Ram Working on Wave Propagation.* (Schweizerische Bauzeitung, Vol. 120, No. 17, 24 Oct., 1942, pp. 191-193.) (G. Eichelberg, Engineers' Digest, Vol. 4, No. 5, May, 1943, pp. 151-155.)
194	13629	G.B.	*Remote Control by Hydraulics.* (Aeronautics, Vol. 8, No. 6, July, 1943, pp. 48-49.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
195	13747	G.B. ...	... *Applications of Fluid Dynamics.* (Mechanical World, Vol. 114, No. 2,955, 20/8/43, p. 210.)

AIRCRAFT AND ACCESSORIES.

Air Transport and Post-War Aviation.

196	12451	G.B. ...	... *Air Transport for London.* (R. F. Lloyd Jones, Aeroplane, Vol. 65, No. 1,676, 9/7/43, pp. 32-33.)
197	12490	U.S.A.	... *Bulk Cargoes by Plane.* (Trade Winds, April, 1943, pp. 8-9.)
198	12493	Canada	... *The Future of Aviation in Canada.* (Canadian Aviation, Vol. 16, No. 4, April, 1943, pp. 54, 94.)
199	12519	Canada	... *The Story of Trans-Canada Air Lines.* (W. A. Hunter, Commercial Aviation, Vol. 5, No. 4, April, 1943, pp. 48-68, 102.)
200	12571	U.S.A.	... *Future of Aviation (Excerpts from Paper).* (R. S. Damon, S.A.E. Journal, Vol. 51, No. 1, July, 1943, pp. 42, 69-70.)
201	12574	U.S.A.	... *Future of Air Commerce (Excerpt from Papers).* (M. H. Anderson, S.A.E. Journal, Vol. 51, No. 1, July, 1943, pp. 43-44.)
202	12610	U.S.A.	... *American Air Lines Opposed to Post-War Government Management.* (American Aviation, Vol. 7, No. 1, 1/6/43, pp. 32, 38.)
203	12611	U.S.A.	... *Plan for U.S. 20,000 Post-War Airports and Flight Strips.* (American Aviation, Vol. 7, No. 1, 1/6/43, p. 38.)
204	12628	U.S.A.	... *Post-War Aviation and Freedom of the Area.* (Kaemffert, American Aviation, Vol. 6, No. 24, 15/5/43, p. 35.)
205	12633	U.S.A.	... *C.A.B. Investigator of Post-War International Aviation.* (American Aviation, Vol. 6, No. 24, 15/5/43, pp. 13, 52-55.)
206	12740	U.S.A.	... *The Future of Air Transport (Report of Office of War Information).* (W. Thompson, American Aviation, Vol. 7, No. 2, 15/6/43, p. 29.)
207	12741	U.S.A.	... *Post-War Aviation (Wilbur Wright Memorial Lecture).* (E. P. Warner, American Aviation, Vol. 7, No. 2, 15/6/43, pp. 26-30.)
208	12747	U.S.A.	... *Transporting Food by Air.* (American Aviation, Vol. 7, No. 2, 15/6/43, p. 62.)
209	12758	U.S.A.	... *25 Years of U.S. Air Mail Service.* (Civil Aeronautics Journal, Vol. 4, No. 6, 15/5/43, pp. 60-61.)
210	12866	G.B. ...	... *A World Air Map.* (Times Trade and Engineering, Vol. 53, No. 952, June, 1943, pp. 31-32.)
211	12973	U.S.A.	... *Our Gigantic Global Air Transport Services (including Photographs of U.S. Transport Aircraft).* (Aero Digest, Vol. 42, No. 6, June, 1943, pp. 118-121, 342-344.)
212	12975	U.S.A.	... *Future Equipment of United Air Lines (Types of Aircraft Envisaged).* (Aero Digest, Vol. 42, No. 6, June, 1943, pp. 145, 315-316.)
213	13000	U.S.A.	... *America's Aviation To-morrow.* (E. S. Gorrell, Aero Digest, Vol. 42, No. 6, June, 1943, pp. 345-347.)

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214	13012	U.S.A. ...	*Study of Air Transport by C.A.B.* (Aero Digest, Vol. 42, No. 6, June, 1943, pp. 449-451.)
215	13068	U.S.A. ...	*Post-War Aviation.* (Automotive Industries, Vol. 88, No. 12, 15/6/43, pp. 17-19, 138-140.)
216	13093	G.B.	*Future of Air Transport—S.B.A.C.s Proposals.* (Times Trade and Engg., Vol. 53, No. 953, July, 1943, p. 33.)
217	13111	U.S.A. ...	*Transportation of Foodstuffs by Air.* (C. Guest, American Aviation, Vol. 7, No. 4, 15/7/43, pp. 16-17, 42c.)
218	13116	U.S.A. ...	*Long-Range Airport Problem.* (E. J. Foley, American Aviation, Vol. 7, No. 4, 15/7/43, pp. 64-65.)
			Civil and Experimental Aircraft Types.
219	12480	G.B.	*Post-War Transport Aircraft (31st Wilbur Wright Memorial Lecture).* (E. P. Warner, Jnl. Roy. Aeron. Soc., Vol. 47, No. 391, July, 1943, pp. 183-256.)
220	12570	U.S.A. ...	*Fundamental Requirements of Post-War Transport Aeroplanes (Excerpts from Paper).* (C. Froesch, S.A.E. Journal, Vol. 51, No. 1, July, 1943, pp. 42, 68-69.)
221	12612	U.S.A. ...	*Four Types of Planes Needed for Post-War Use.* (W. W. Davies, American Aviation, Vol. 7, No. 1, 1/6/43, p. 39.)
222	12648	France ...	*French Commercial Transport S.O. 161 and L. 631.* (Inter. Avia., No. 865-866, 1, 17/4/43, pp. 18-19.)
223	12649	France ...	*Le O 48 Experimental Aircraft without Ailerons (Flying Boat) (Controllable Vertical Guns Placed Near C.G. of Aircraft).* (Inter. Avia., No. 865-866, 17/4/43, p. 19.)
224	13011	U.S.A. ...	*Cessna "Loadmaster" Cargo Aircraft.* (Aero Digest, Vol. 42, No. 6, June, 1943, p. 449.)
225	13033	U.S.A. ...	*Norduyn UC-64 Cargo Transport (Photo).* (Aero Digest, Vol. 42, No. 4, April, 1943, p. 311.)
226	13092	G.B.	*Plans for Post-War Aircraft.* (Times Trade and Engg., Vol. 53, No. 953, July, 1943, p. 32.)
227	13114	U.S.A. ...	*Proposed Characteristics for Future Aeroplanes.* (American Aviation, Vol. 7, No. 4, 15/7/43, p. 42b.)
			General Design—including Patents.
228	13022	U.S.A. ...	*Notes on Hinge Design.* (M. D. Giovanni, Aero Digest, Vol. 42, No. 4, April, 1943, pp. 211, 416.)
229	12525	U.S.A. ...	*Details of Plywood Construction on P.T. 26.* (Commercial Aviation, Vol. 5, No. 4, April, 1943, p. 112.)
230	12520	U.S.A. ...	*"Plastic" Aircraft.* (Commercial Aviation, Vol. 5, No. 4, April, 1943, pp. 80-86.)
231	12516	U.S.A. ...	*Uses of Plywood in Aircraft (Discussion on Paper).* (Mech. Eng., Vol. 65, No. 5, May, 1943, p. 373.)
232	12744	U.S.A. ...	*Snap Vent Made of Lumarith Plastics (Photograph).* (American Aviation, Vol. 7, No. 2, 15/6/43, p. 58.)

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233	12694	U.S.A.	...	*Transparent Plastic Vent for Aeroplane and Glider Cabins.* (Modern Plastics, Vol. 20, No. 7, March, 1943, p. 75.)
234	12856	Germany	...	*Instrument Panel Behind the Pilot (New German Patents).* (Automotive Industries, Vol. 89, No. 2, 15/7/43, p. 86.)
235	12620	U.S.A.	...	*Glass Aeroplane (American Patent).* (American Aviation, Vol. 6, No. 23, 1/5/43, p. 58.)
236	12393	Germany	...	*Patent Series No. 6. Emergency Trailing Antenna with Explosive Projector* (732,106). (Telefunken, Flugsport, Vol. 35, No. 11, 14/7/43, p. 39.)
237	12395	France	...	*Reversed Flow Radiator Cowl (Radiator Behind Pilot)* (733,564). (Bugatti, Flugsport, Vol. 35, No. 11, 14/7/43, p. 39.)
238	12398	Germany	...	*Cowling Clip* (732,795). (Junkers, Flugsport, Vol. 35, No. 11, 14/7/43, p. 38.)
				Stability and Control.
239	12875	G.B. ...	...	*The Lateral Stability of Aeroplanes—A New Geometrical System of Analysis.* (Aircraft Engineering, Vol. 15, No. 174, Aug., 1943, pp. 228-233.)
240	12876	G.B. ...	...	*The Problem of Wing Oscillation—Influence of Material and Size on Flexural and Torsional Frequencies.* (Z. Krzywoblocki, Aircraft Engineering, Vol. 15, No. 174, Aug., 1943, pp. 234-237.)
				Cabins and Windshields.
241	12563	U.S.A.	...	*Cabin Supercharging in Scheduled Airline Operation.* (R. L. Ellinger, S.A.E. Journal, Vol. 51, No. 1, July, 1943, pp. 241-247.)
242	12703	U.S.A.	...	*Impact Resistant Aircraft Wind Shields.* (G. L. Pigman, Modern Plastics, Vol. 20, No. 7, March, 1943, pp. 107, 150.)
243	12905	G.B. ...	...	*Bird Proof Wind Shields.* (British Plastics, Vol. 15, No. 171, Aug., 1943, p. 132.)
244	12759	U.S.A.	...	*New Wind Shield Protects Against Birds and Ice.* (Civil Aeronautics Journal, Vol. 4, No. 6, 15/3/43, p. 29.)
				Landing and Other Gear.
245	12572	U.S.A.	...	*High Pressure Hydraulic Systems (Excerpts from Paper).* (P. de Beixedon, S.A.E. Journal, Vol. 51, No. 1, July, 1943, pp. 43-71.)
246	12631	U.S.A.	...	*New Channel-Tread Wheel Tyres.* (American Aviation, Vol. 6, No. 24, 15/5/43, p. 57.)
247	12851	U.S.A.	...	*Aircraft Tyres Made with Nylon Cords.* (Automotive Industries, Vol. 89, No. 2, 15/7/43, p. 44.)
248	12979	U.S.A.	...	*Levered Suspension Landing Gear Development.* (J. A. Zagusta, Aero Digest, Vol. 42, No. 6, June, 1943, pp. 161-169, 321-324.)
249	13016	U.S.A.	...	*Bevel Gears in Aircraft (Pt. I).* (A. H. Candee, Aero Digest, Vol. 42, No. 4, April, 1943, pp. 167-176, 254-256.)
250	13089	G.B. ...	...	*Aircraft Gears.* (P. W. Brown and E. V. Farrar, Mechanical World, Vol. 114, No. 2,951, 23/7/43, pp. 105-109.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
			Propellers.
251	12394	Germany ...	*V.P. Propeller with Hydraulic Mechanism Mounted on Crankshaft Behind Propeller* (732,794). (V.D.M., Flugsport, Vol. 35, No. 11, 14/7/43, p. 37.)
252	12396	Germany ...	*V.P. Propeller Operated by Thermal Expansion of a Control Member* (733,062-733,063). (G.E.C., Flugsport, Vol. 35, No. 11, 14/7/43, p. 37.)
253	12397	Germany ...	*Manufacture of Hollow Light Alloy Propeller Blades* (733,133). (V.L.W., Flugsport, Vol. 35, No. 11, 14/7/43, p. 38.)
254	12537	G.B.	*Heat-Treating Airscrew Blades.* (Aircraft Production, Vol. 5, No. 57, July, 1943, p. 343.)
255	12573	U.S.A. ...	*Notes on the Selection and Installation of Aircraft Propellers (Excerpt from Papers).* (T. B. Rhines, S.A.E. Journal, Vol. 51, No. 1, July, 1943, pp. 43, 71-72.)
256	12641	G.B.	*The Rotol Four-Bladed V.P. Airscrew.* (Engineering, Vol. 156, No. 4,048, 13/8/43, pp. 125-128.)
257	12794	U.S.A. ...	*High Frequency Current for Heating Propeller Blade Shank.* (Flying and Industrial Aviation, Vol. 32, No. 4, April, 1943, p. 114.)
258	13017	U.S.A. ...	*Design and Manufacture of Curtiss Propellers.* (Aero Digest, Vol. 42, No. 4, April, 1943, pp. 179-180, 272-276.)
259	13023	G.B.	*British Propeller Development.* (G. E. Rochester, Aero Digest, Vol. 42, No. 4, April, 1943, pp. 212, 265-266.)
260	13025	U.S.A. ...	*Aero Product's Constant Speed Propeller.* (J. F Haines, Aero Digest, Vol. 42, No. 4, April, 1943, pp. 219-220, 416.)
261	13041	G.B.	*Wood Airscrew Blades.* (Aircraft Production, Vol. 5, No. 54, April, 1943, pp. 155-158.)
262	13045	U.S.A. ...	*Curtiss-Wright Electrically Operated Contra-Rotating Airscrews (Hollow Steel Blades).* (Aircraft Production, Vol. 5, No. 54, April, 1943, p. 169.)
			Airfields, Seadromes and Servicing.
263	12524	U.S.A. ...	*Timber Connectors in Hangar Construction.* (H. Harvey, Commercial Aviation, Vol. 5, No. 4, April, 1943, pp. 110-112.)
264	12613	U.S.A. ...	*"Seadrome" Trans-Atlantic Route to England Proposed.* (American Aviation, Vol. 7, No. 1, 1/6/43, p. 55.)
265	12655	U.S.A. ...	*Flight Testing Equipment for Large Aircraft.* (W. F. Dickinson, S.A.E.J., Vol. 51, No. 4, April, 1943, pp. 139-147.)
266	12742	U.S.A. ...	*Time-Saving Method of Changing Tyres on War Cargo Transport Planes.* (American Aviation, Vol. 7, No. 2, 15/6/43, p. 45.)
267	12743	U.S.A. ...	*Mechanical Cement Spreader for Airports Dissembled for Air Shipment.* (American Aviation, Vol. 7, No. 2, 15/6/43, p. 48.)

ITEM NO.	R.T.P. REF.			TITLE AND JOURNAL.
268	12750	U.S.A.	...	*The Maintenance Problem in International Air Transportation.* (E. J. Foley, American Aviation, Vol. 7, No. 2, 15/6/43, pp. 58, 71-72.)
269	12777	U.S.A.	...	*Construction of Roads and Airports.* (C. Fuller, Flying and Industrial Aviation, Vol. 32, No. 4, April, 1943, pp. 45, 150-152.)
270	12798	U.S.A.	...	*Maintenance Inspections.* (R. J. Curry, Flying and Industrial Aviation, Vol. 32, No. 4, April, 1943, pp. 136-138.)
271	12867	G.B. ...	...	*Atlantic Seadromes.* (Times Trade and Engineering, Vol. 53, No. 952, June, 1943, p. 33.)
272	13008	U.S.A.	...	*Proposed Seadrome for Trans-Atlantic Travel.* (Aero Digest, Vol. 42, No. 6, June, 1943, p. 445.)
273	13067	Canada	...	*Goose Airport—World's Largest Flying Field.* (W. A. Shields, Canadian Aviation, Vol. 16, No. 6, June, 1943, pp. 87-90, 117-118.)
274	13075	U.S.A.	...	*Portable Hoist for Aircraft Service.* (Automotive Industries, Vol. 88, No. 12, 15/6/43, p. 40.)
275	13077	U.S.A.	...	*Brake Tester for Aircraft.* (Automotive Industries, Vol. 88, No. 12, 15/6/43, pp. 40, 92.)

ENGINES AND ACCESSORIES.

Named Types.

276	12440	Germany	...	*Modifications to the D.B. 601 (Engine).* (Aeroplane, Vol. 65, No. 1,678, 23/7/43, p. 109.)
277	12499	Canada	...	*New Lycoming Engine.* (Canadian Aviation, Vol. 16, No. 4, April, 1943, p. 146.)
278	12569	U.S.A.	...	*New Light Weight Marine Diesel Engine.* (J. C. Fetters, S.A.E. Journal, Vol. 51, No. 1, July, 1943, pp. 63-64.)
279	12650	France	...	*Béarn 6D 300 h.p. Cylinder In-line Air-Cooled Engine.* (Inter. Avia., No. 865-866, 17/4/43, pp. 19-20.)
280	12686	Germany	...	*The New B.M.W. Motor Cycle Combination with Wheel Drive.* (From A.T.Z., Vol. 45, No. 14, July 25, 1942, p. 400.) (St. von Szenásy, Engineers' Digest, Vol. 4, No. 3, March, 1943, pp. 93-95.)
281	12802	U.S.A.	...	*Excess Air and b.m.e.p. of Internal Combustion Engines.* (P. H. Schweitzer, Trans. A.S.M.E., Vol. 65, No. 3, April, 1943, pp. 159-163.)
282	12841	Germany	...	*New German Marine Engine (Deutz 12-Cylinder V Type Diesel).* (Automotive Industries, Vol. 89, No. 2, 15/7/43, pp. 19, 150.)
283	13071	U.S.A.	...	*Light Weight Diesel Engine for the Navy.* (J. C. Fetters, Automotive Industries, Vol. 88, No. 12, 15/6/43, pp. 25, 70-72.)
284	13117	U.S.A.	...	*New Curtiss-Wright Engine Synchronizer has Single Control.* (American Aviation, Vol. 7, No. 4, 15/7/43, p. 75.)
285	13131	G.B. ...	...	*Triple Expansion Engines for Liberty Ships.* (Machinery, Vol. 62, No. 1,602, 24/6/43, pp. 682-688.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
			Design and Installation.
286	12399	Germany ...	*Composite Metal-Rubber Bearing Support for Aircraft Engines* (733,768). (Metallgommi, Flugsport, Vol. 35, No. 11, 14/7/43, p. 38.)
287	12400	Germany ...	*Armour Protection for Cowled Radiator Installations* (732,105). (Heinkel, Flugsport, Vol. 35, No. 11, 14/7/43, p. 39.)
288	12542	U.S.A. ...	*Proposed Expressions for Root's Supercharger Design and Efficiencies.* (F. A. Hiersch, Preprints of Papers Presented at the A.S.M.E., June 14-16, 1943.)
289	12580	U.S.A. ...	*Factors Involved in Designing an Efficient Single Purpose Military Engine.* (C. E. Cummings, S.A.E. Journal, Vol. 51, No. 1, July, 1943, p. 62.)
290	12687	Switzerland ...	*The Thoma-Demag Hydraulic Gear for High Speed Diesel Engines.* (From Schweizerische Bauzeitung, Vol. 120, No. 14, Oct. 3, 1942, p. 164.) (Engineers' Digest, Vol. 4, No. 3, March, 1943, pp. 95-96.)
			Wear and Efficiency.
291	12544	U.S.A. ...	*Engine Wear and its Measurement in the Study of Lubrication.* (Preprints of Papers Presented at the A.S.M.E., June 14-16, 1943.)
292	12576	U.S.A. ...	*Exhaust Noise and Utilisation of Exhaust Energy.* (R. L. Leadbetter, S.A.E. Journal, Vol. 51, No. 1, July, 1943, pp. 28, 58.)
293	12577	U.S.A. ...	*Diesel Engine Fouling and Wear—the Effect of Fuel.* (G. H. Cloud and A. J. Blackwood, S.A.E. Journal, Vol. 51, No. 1, July, 1943, pp. 58-60.)
294	12711	G.B.	*Piston Skirt Deposits—New Methods for Evaluating and Recording.* (H. R. Luck and others, Automobile Engineer, Vol. 33, No. 439, Aug., 1943, pp. 321-325.)
			Testing and Maintenance.
295	12539	G.B.	*Engine Power Recovery. The Buick Feed-Back System of Testing Pratt and Whitney Aero Engines.* (Aircraft Prod., Vol. 5, No. 57, July, 1943, pp. 344-346.)
296	12568	U.S.A. ...	*Maintenance Problems for Submarine Diesel Engines.* (R. J. Moore, S.A.E. Journal, Vol. 51, No. 1, July, 1943, p. 63.)
297	12575	U.S.A. ...	*Procedures for Conservation of Anti-Freeze Solutions.* (S.A.E. Journal, Vol. 51, No. 7, July, 1943, pp. 74-75.)
298	12617	U.S.A. ...	*Need for Power Plant Test Stand.* (E. J. Foley, American Aviation, Vol. 6, No. 23, 1/5/43, p. 32.)
299	12652	U.S.A. ...	*Methods of Stress Determination in Engine Parts.* (C. Lipson, S.A.E.J., Vol. 51, No. 4, April, 1943, pp. 105-124.)
300	12676	Germany ...	*Gas Temperature Measurements in Internal Combustion Engines.* (From Z.V.D.I., Vol. 86, No. 29-30, July 25, 1942, pp. 461-466.) (H. Graff, Engineers' Digest, Vol. 4, No. 3, March, 1943, pp. 67-69.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
301	12840	U.S.A. ...	*Training of Aircraft Engine Mechanics.* (E. L. Warner, Automotive Industries, Vol. 89, No. 2, 15/7/43, pp. 17-18, 98-100.)
			Turbines, Pumps, etc.
302	12753	U.S.A. ...	*Gas Turbines for Planes.* (American Aviation, Vol. 7, No. 2, 15/6/43, p. 69.)
303	12801	U.S.A. ...	*The Elimination of Carry-Over Under Steel Mill Operating Conditions in Boilers.* (H. M. Rivers and W. P. Hill, Trans. A.S.M.E., Vol. 65, No. 3, April, 1943, pp. 149-158.)
304	12803	U.S.A. ...	*Power Pulsation Between Synchronous Generators.* (T. Warming, Trans. A.S.M.E., Vol. 65, No. 3, April, 1943, pp. 165-176.)
305	13076	U.S.A. ...	*New Method of Treating Carbon Brushes for Aircraft Generators to Overcome the Effects of Altitude.* (Automotive Industries, Vol. 88, No. 12, 15/6/43, p. 40.)
306	13124	G.B.	*High Pressure Pump Production.* (Machinery, Vol. 63, No. 1,608, 5/8/43, pp. 150-152.)
			Accessories (Cylinders, Governors, etc.).
307	12558	U.S.A. ...	*Substitution for Aluminium in Brake Cylinder Pistons.* (J. F. Bachman, S.A.E. Journal, Vol. 51, No. 1, July, 1943, p. 67.)
308	12561	U.S.A. ...	*Aircraft Accessory System.* (T. B. Holliday, S.A.E. Journal, Vol. 51, No. 1, July, 1943, pp. 234-240, 247.)
309	12679	G.B.	*Aircraft Engine Bearings.* (T. Barish, Engineers' Digest, Vol. 4, No. 3, March, 1943, pp. 75-76.)
310	12680	Germany ...	*The Load Carrying Capacity of Plastic Bearings.* (From Maschinenbau (Der Betrieb), Vol. 21, No. 6, June, 1942, pp. 257-261.) (H. Frank, Engineers' Digest, Vol. 4, No. 3, March, 1943, pp. 77-80.)
311	12683	Germany ...	*Light Alloy Pistons for Internal Combustion Engines.* (Brennstoff und Wärmewirtschaft, Vol. 24, No. 6, June, 1942, pp. 97-101.) (Engineers' Digest, Vol. 4, No. 3, March, 1943, pp. 82-85.)
312	12690	Germany ...	*Centrifugal Contact Governor for Universal Motors.* (From Elektrotechnische Anzeiger, Vol. 59, No. 10, May 13, 1942, pp. 218-220.) (M. Voege, Engineers' Digest, Vol. 4, No. 3, March, 1943, pp. 91-92.)
313	12773	U.S.A. ...	*Low Nickel Steel for Roller Bearings.* (Metal Progress, Vol. 43, No. 6, June, 1943, pp. 909-910.)
314	12909	G.B.	*Plastics Tested for Brake Cylinder Pistons.* (British Plastics, Vol. 15, No. 171, Aug., 1943, p. 144.)
315	13056	U.S.A. ...	*Silver-Lead Bearings (New U.S.A. Patent).* (Aircraft Production, Vol. 5, No. 54, April, 1943, p. 194.)
			Cold Starting.
316	12548	U.S.A. ...	*Engine Heater for Quick Starting on Alaskan Airfields (Photograph).* (American Aviation, Vol. 6, No. 22, 15/4/43, p. 18.)

ITEM NO.	R.T.P. REF.			TITLE AND JOURNAL.
317	12634	U.S.A.	...	*Progress Report on Cold Starting. Data of the Automotive Diesel Fuel Division of the Co-operative Fuel Research Committee.* (F. C. Burk, S.M.E. Preprints, War Engineering Prod. Meeting, Jan. 11-15, 1943.)
318	12635	U.S.A.	...	*Cold Starting Tests on Diesel Engines.* (H. R. Porter, S.M.E. Preprints, War Eng. Prod. Meeting, Jan. 11-15, 1943.)
319	12636	U.S.A.	...	*Cranking Power and Torque Requirements at Sub-Zero Temperatures.* (H. L. Knudsen, S.M.E. Preprints, War Eng. Prod. Meeting, Jan. 11-15, 1943.)
320	12637	U.S.A.	...	*Effect of Injection Pump on Cold Starting.* (M. R. Roenach, S.M.E. Preprints, War Eng. Prod. Meeting, Jan. 11-15, 1943.)
321	12709	G.B. ...	...	*Diesel Engines—Starting at Sub-Zero Temperatures.* (Automobile Engineer, Vol. 33, No. 439, Aug., 1943, pp. 315-316.)

FUELS AND LUBRICANTS.

Fuels (Aviation, Marine, Special).

322	12482	G.B. ...	...	*Pulverised Fuel for Metallurgical Furnaces.* (C. S. Darling, Mechanical World, Vol. 114, No. 2,950, 16/7/43, pp. 60-63.)
323	12486	G.B. ...	...	*Fuel for Marine Propulsion (Use of Coal).* (Mechanical World, Vol. 114, No. 2,950, 16/7/43, p. 75.)
324	12684	Germany	...	*Liquefied Gas Fuel for Diesel Engines.* (From A.T.Z., Vol. 45, No. 8, April 25, 1942, pp. 201-207.) (F. Dreyhaupt, Engineers' Digest, Vol. 4, No. 3, March, 1943, pp. 85-88.)
325	12707	G.B. ...	...	*Alternative Fuels, Pt. I, Acetylene.* (Automobile Engineer, Vol. 33, No. 439, Aug., 1943, pp. 299-307.)
326	12736	G.B. ...	...	*English Wood Charcoals.* (L. G. G. Warne, J. of the Soc. of Chemical Industry, Vol. 62, No. 6, June, 1943, pp. 88-90.)
327	12852	U.S.A.	...	*Electro-Magnetic System of Fuel Injection.* (Automotive Industries, Vol. 89, No. 2, 15/7/43, p. 69.)
328	13035	U.S.A.	...	*Improved Aviation Gasoline.* (Aero Digest, Vol. 42, No. 4, April, 1943, p. 312.)
329	13087	G.B. ...	...	*The Petroleum Refining Process (Demonstration Model).* (Mechanical World, Vol. 114, No. 2,951, 23/7/43, pp. 94-95.)
330	13137	G.B. ...	...	*The World's Ultimate Petroleum Reserves.* (J. G. Bennett, Petroleum Times, Vol. 47, No. 1,201, 7/8/43, p. 400.)
331	13138	Sweden	...	*Sweden's Liquid Fuel Problems.* (E. A. Bell, Petroleum Times, Vol. 47, No. 1,201, 7/8/43, pp. 404-405.)
332	13139	Rumania	...	*New Products from Roumanian Methane.* (E. A. Bell, Petroleum Times, Vol. 47, No. 1,201, 7/8/43, pp. 406-410.)

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333	13147	G.B.	...	*Fractional Distillation on Binary Mixtures, Number of Theoretical Plates and Transfer Units.* (A. J. V. Underwood, Institute of Petroleum, Vol. 29, No. 234, June, 1943, pp. 147-156.)
334	13155	G.B.	...	*Education and the Petroleum Industry.* (V. C. Illing, Petroleum Times, Vol. 47, No. 1,200, 24/7/43, pp. 374-377.)

Oils and Lubrication.

335	12508	U.S.A.	...	*Influence of Machine Design on Lubrication.* (W. G. G. Godron, Mech. Eng., Vol. 65, No. 5, May, 1943, pp. 347-349, 359.)
336	12578	U.S.A.	...	*Diesel Motor Oils Compared by Laboratory and Field Tests.* (R. S. Wetmiller, S.A.E. Journal, Vol. 51, No. 1, July, 1943, p. 60.)
337	12654	U.S.A.	...	*Re-Refining of Aircraft Engine Oils.* (G. K. Brower, S.A.E.J., Vol. 51, No. 4, April, 1943, pp. 130-138.)
338	12658	G.B.	...	*The Search for Oil.* (J. Roberts, Petroleum Times, Vol. 47, No. 1,196, 29/5/43, pp. 255-256, 264.)
339	12685	Germany	...	*Measurement of Impurities (Metal) in Duty Oil.* (From A.T.Z., Vol. 45, No. 19, Oct. 10, 1942, pp. 523-525.) (H. Graff and L. Nenninger, Engineers' Digest, Vol. 4, No. 3, March, 1943, pp. 88-89.)
340	13051	U.S.A.	...	*Suggestion for Standard Colour Code for Lubricants.* (Aircraft Production, Vol. 5, No. 54, April, 1943, p. 169.)
341	13136	U.S.S.R.	...	*Some Figures on Russian Crude Oil Output.* (Petroleum Times, Vol. 47, No. 1,201, 7/8/43, p. 394.)
342	13154	G.B.	...	*Coal and Oil—New Facts and Future Problems.* (W. A. Bristow, Petroleum Times, Vol. 47, No. 1,200, 24/7/43, pp. 368-371.)

Oil Testing.

343	12638	U.S.A.	...	*Piston Ring Scuffing as a Criterion of Oil Performance.* (G. H. Keller, S.M.E. Preprints, War Eng. Prod. Meeting, Jan. 11-15, 1943.)
344	12653	U.S.A.	..	*Piston Rings Scuffing as Criterion of Oil Performance.* (G. H. Keller, S.A.E.J., Vol. 51, No. 4, April, 1943, pp. 125-129.)
345	12579	U.S.A.	..	*24-Hr. Test Developed to Study Motor Oils.* (S.A.E. Journal, Vol. 51, No. 1, July, 1943, pp. 60-61.)

THEORY OF ELASTICITY.

Stresses in Beams, Springs, Plates, etc.

346	12367	Germany	...	*Elastic Modulus by Dynamic Method of Plastic Materials.* (Fröhlich, Plastics, Vol. 7, No. 75, August, 1943, p. 334.)
347	12543	U.S.A.	...	*Stress Distributions in Cylindrically Aeolotropic Plates.* (G. F. Garrier, Preprints of Papers Presented at the A.S.M.E., June 14-16, 1943.)

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348	12564	U.S.A. ...	*Shot Blasting to Increase Fatigue Resistance.* (J. O. Almen, S.A.E. Journal, Vol. 51, No. 1, July, 1943, pp. 248-268, 64.)
349	12582	U.S.A. ...	*Significance of the Secant and Tangent Moduli of Elasticity in Structural Design.* (D. S. Wolford, Aero Sciences, Vol. 10, No. 6, June, 1943, pp. 169-179.)
350	12601	U.S.A. ...	*Failure from Creep as Influenced by State of Stress.* (W. Siegfried, A.S.M.E. Preprints.)
351	12657	G.B.	*Compression Flanges of Larger Plate Girders.* (J. E. Kindler, Civil Engineering, Vol. 38, No. 441, March, 1943, pp. 60-64.)
352	12766	U.S.A. ...	*Ship Plate, Cracked Weldings and Internal Stresses.* (Metal Progress, Vol. 43, No. 6, June, 1943, pp. 919-926.)
353	12772	U.S.A. ...	*Triaxial Stresses in Plastic Deformation.* (Metal Progress, Vol. 43, No. 6, June, 1943, p. 946.)
354	12805	U.S.A. ...	*Behaviour of Plywood Under Repeated Stresses.* (A. G. H. Dietz and H. Grinsfelder, Trans. A.S.M.E., Vol. 65, No. 3, April, 1943, pp. 187-191.)
355	12832	G.B.	*Introduction to the Theory of Photoelasticity and its Application to the Problems of Stress Analysis.* (R. E. Arthur, J. of the Royal Aeron. Soc., Vol. 47, No. 392, Aug., 1942, pp. 263-272.)
356	12888	Germany ...	*Surface Compression a Means of Increasing the Fatigue Strength of Springs Used in Motor Vehicles.* (From A.T.Z., Vol. 45, No. 12, June 25, 1942, pp. 321-325.) (O. Foeppl, Engineers' Digest, Vol. 4, No. 4, April, 1943, pp. 111-112.)
357	12896	Germany ...	*Calculation for Rubber Springs.* (From V.D.I. Zeitschrift, Vol. 86, Nos. 35-36, Sept., 1942, pp. 535-538.) (C. W. Kosten, Engineers' Digest, Vol. 4, No. 4, April, 1943, pp. 123-126.)
358	12897	Germany ...	*Extensometer Measurements on the Back Axle of a Lorry.* (From A.T.Z., Vol. 45, No. 17, Sept. 10, 1942, pp. 461-470.) (E. Lehr and R. Schulz, Engineers' Digest, Vol. 4, No. 4, April, 1943, pp. 126-128.)
359	12938	G.B.	*Curved Beams and Press Frames.* (Machinery, Vol. 62, No. 1,600, 10/6/43, pp. 630-631.)
360	12989	U.S.A. ...	*Improving the Fatigue Strength of Engine Parts.* (J. O. Almen, Aero Digest, Vol. 42, No. 6, June, 1943, pp. 217-223, 329-330.)
361	13102	Germany ...	*The Influence of Deformation on the Internal Loads of Beams with a Straight Axis.* (Luftfahrtforschung, Vol. 19, No. 9, Oct., 1942, pp. 320-325.) (F. Reinitzhuber, Engineers' Digest, Vol. 4, No. 5, May, 1943, pp. 133-136.)
362	13103	Germany ...	*Extensometer Measurements on the Back Axle of a Lorry (Contd.).* (A.T.Z., Vol. 45, No. 17, Sept. 10, 1942, pp. 461-470.) (H. E. Lehr and R. Schulz, Engineers' Digest, Vol. 4, No. 5, May, 1943, pp. 136-141.)

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MATERIALS (PROPERTIES, FABRICATION, INSPECTION).

A. Properties.

Al. and Mg. Alloys.

363	12420	G.B.	*The Use of Corrosion Inhibitors for Aluminium Chemical Equipment.* (R. B. Mears and G. C. Eldridge, Metal Industry, Vol. 63, No. 7, 13/8/43, pp. 101-104.)
364	12483	G.B.	*Impurities in Aluminium Casting Alloys—Effects of Minor Alloying Elements.* (Mechanical World, Vol. 114, No. 2,950, 16/7/43, pp. 64-65.)
365	12511	U.S.A. ...	*Working Aluminium.* (Mech. Eng., Vol. 65, No. 5, May, 1943, p. 364.)
366	12540	G.B.	*Magnesium Plating Bath.* (Aircraft Prod., Vol. 5, No. 57, July, 1943, p. 346.)
367	12581	U.S.A. ...	*Elevated Temperature Ageing of 24S Aluminium Alloy.* (P. P. Mozley, Aero Sciences, Vol. 10, No. 6, June, 1943, pp. 180-184.)
368	12664	G.B.	*Magnesium Cleaning.* (Sheet Metal Industries, Vol. 17, No. 195, July, 1943, p. 1207.)
369	12670	G.B.	*Fabrication of Aluminium Alloys.* (E. G. West, Sheet Metal Industries, Vol. 17, No. 195, July, 1943, p. 1228.)
370	12732	G.B.	*The Constitution of Magnesium-Manganese Zinc-Aluminium Alloys in the Range* 0-5 *per cent. Magnesium,* 0-2 *per cent. Manganese,* 0-8 *per cent. Zinc. I, The Liquidus.* (E. Butchers and others, J. Inst. Metals, Vol. 69, No. 5, May, 1943, pp. 209-228.)
371	12734	G.B.	*Discussion on Papers entitled, "A Note on the Damping Characteristics of Some Magnesium and Aluminium Alloys."* (J. Inst. Metals, Vol. 69, No. 5, May, 1943, pp. 233-239.)
372	12834	G.B.	*Alloys of Magnesium, Pt. 14. The Constitution of the Magnesium-Rich Alloys of Magnesium and Manganese.* (J. D. Grogan and J. L. Houghton, J. of the Inst. of Metals, Vol. 69, No. 6, June, 1943, pp. 241-248.)
373	12940	G.B.	*Magnesium Alloys in Structional Engineering.* (L. P. Dudley, Light Metals, Vol. 6, No. 63, April, 1943, pp. 158-163.)
374	12946	G.B.	*Forgeability of Light Alloys.* (Light Metals, Vol. 6, No. 63, April, 1943, pp. 189-192.)
375	12952	G.B.	*Present Advantages and Limitations of Al. and Mg. Alloys in Aircraft Construction and Possible Use of Be.-Al. Alloys and Non-Metals.* (Light Metals, Vol. 6, No. 62, March, 1943, pp. 122-123.)
376	12956	G.B.	*Current Light Alloy Specifications (April 1, 1943).* (Light Metals, Vol. 6, No. 64, May, 1943, pp. 243-249.)
377	12962	Germany ...	*Aluminium Containing Zinc-Base Bearings.* (Schmid and Weber, Light Metals, Vol. 6, No. 60, Jan., 1943, pp. 25-28.)
378	12963	G.B.	*Magnesium Protected by Steam.* (Light Metals, Vol. 6, No. 60, Jan., 1943, p. 29.)

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379	12964	G.B.	...	*Extinguishing Magnesium Fires.* (Light Metals, Vol. 6, No. 60, Jan., 1943, p. 30.)
380	12965	Germany	...	*Alumina from Aluminium Silicates.* (Light Metals, Vol. 6, No. 60, Jan., 1943, p. 30.)
381	13132	G.B.	...	*Rubber Forming of Magnesium Alloy.* (Machinery, Vol. 62, No. 1,602, 24/6/43, p. 688.)
382	13135	G.B.	...	*The Constitution of Alloys of Aluminium with Manganese, Silicon and Iron. I, The Binary System—Aluminium and Manganese; II., The Fernary Systems, Aluminium-Manganese-Silicon and Aluminium-Manganese-Iron.* (Journal of Inst. of Metals, Vol. 69, No. 7, July, 1943, pp. 275-316.)
				Iron and Steel.
383	12538	G.B.	...	*British and American Specifications for Iron and Steel (B.S. 1,111).* (Aircraft Prod., Vol. 5, No. 57, July, 1943, p. 343.)
384	12761	U.S.A.	...	*Supposed Graphite in Carburized N.E. and S.A.E. Steels. Investigation of the Grain Boundary Condition.* (J. Welchner and R. W. Roush, Metal Progress, Vol. 43, No. 6, June, 1943, pp. 889-896.)
385	12769	U.S.A.	...	*Effects of Tin in Carbon Steel.* (J. W. Halley, Metal Progress, Vol. 43, No. 6, June, 1943, p. 936.)
386	13086	G.B.	...	*The Production of Malleable Iron Castings.* (J. Roxburgh, Mechanical World, Vol. 114, No. 2,951, 23/7/43, pp. 90-93.)
387	13104	Germany	...	*A Contribution to the Chemistry of Steel Works Analysis.* (Stahl und Eisen, Vol. 62, No. 44, Oct., 1942, pp. 923-926.) (A. Stadeler, Engineers' Digest, Vol. 4, No. 5, May, 1943, pp. 141-142.)
388	13105	Germany	...	*The Influence of Molybdenum and Vanadium Additions on Low Tungsten High Speed Steels Containing 4 per cent. Chromium.* (Stahl und Eisen, Vol. 62, No. 44, Oct., 1942, pp. 922-923.) (H. Kessner, Engineers' Digest, Vol. 4, No. 5, May, 1943, p. 143.)
389	13106	Germany	...	*The Formation of a Zinc-Iron Alloy in the Process of High Temperature Galvanisation.* (Stahl und Eisen, Vol. 62, No. 18, April 30, 1942, pp. 374-376.) (W. Raedeker, Engineers' Digest, Vol. 4, No. 5, May, 1943, p. 144.)
390	13110	Germany	...	*A Contribution to the Metallurgical Treatment of Malleable Cast Iron.* (Die Giesserei, Vol. 29, No. 21, Oct., 1942, pp. 356-358.) (G. Brinkman and P. Tobias, Engineers' Digest, Vol. 4, No. 5, May, 1943, pp. 157-158.)
391	13149	G.B.	...	*Promotion of the Corrosion of Iron in Alkaline Solutions by Zinc and Aluminium.* (G. Nilssom, Nature, Vol. 152, No. 3,850, 14/8/43, pp. 189-190.)

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			Non-Ferrous Alloys.
392	12422	G.B.	*Antimony Bronze for Use in Gears.* (H. J. Roast, Metal Industry, Vol. 63, No. 7, 13/8/43, pp. 105-106.)
393	12423	G.B.	*Copper-Antimony-Nickel Gear Alloy.* (Metal Industry, Vol. 63, No. 7, 13/8/43, pp. 106-108.)
394	12425	G.B.	*Semi-Conducting Properties of Stannous Sulphide.* (M. C. Clark and J. S. Anderson, Nature, Vol. 152, No. 3,846, 17/7/43, pp. 75-76.)
395	12640	G.B.	*The Problem of Copper and Galvanised Iron in the Same Water System (Contd.).* (L. Kenworthy, Engineering, Vol. 156, No. 4,048, 13/8/43, p. 125.)
396	12731	G.B.	*Directional Characteristics of Single Texture Structure Copper Strip.* (M. Cook and T. L. Richards, J. Inst. Metals, Vol. 69, No. 5, May, 1943, pp. 201-207.)
397	12733	G.B.	*Discussion on Papers Entitled, "The Properties of Commercial Coppers Containing Selenium, Tellurium and Bismuth," and "The Effect of Selenium, Tellurium and Bismuth on De-Oxidized Copper for Tube Manufacture."* (J. Inst. Metals, Vol. 69, No. 5, May, 1943, pp. 229-234.)
398	12762	U.S.A. ...	*Cartridge Brass.* (L. E. Gibbs, Metal Progress, Vol. 43, No. 6, June, 1943, pp. 897-900.)
399	12763	U.S.A. ...	*Beryllium.* (Metal Progress, Vol. 43, No. 6, June, 1943, pp. 904-907, 942.)
400	12767	U.S.A. ...	*Importance of Impurity-Free Zinc Base Die Castings.* (Metal Progress, Vol. 43, No. 6, June, 1943, p. 930.)
401	12770	U.S.A. ...	*Boron as an Alloying Element.* (Metal Progress, Vol. 43, No. 6, June, 1943, p. 944.)
402	12775	U.S.A. ...	*New Lead Alloy ("Tubeloy").* (Metal Progress, Vol. 43, No. 6, June, 1943, p. 911.)
403	12835	G.B.	*The Expansion of a Bismuth-Lead-Tin-Cadmium Alloy on Cooling After Solidification.* (L. E. Benson and M. B. Coyle, J. of the Inst. of Metals, Vol. 69, No. 6, June, 1943, pp. 249-257.)
404	12838	G.B.	*Correspondence on "The Effect of Grain Size on the Tensile Strength of Tin and Tin Alloys."* (J. of the Inst. of Metals, Vol. 69, No. 6, June, 1943, pp. 272-273.)
405	12854	U.S.A. ...	*Conservation of Tungsten in Automotive Electrical Parts.* (Automotive Industries, Vol. 89, No. 2, 15/7/43, p. 74.)
406	12863	G.B.	*Copper and the War.* (Times, Trade and Engineering, Vol. 53, No. 952, June, 1943, p. 9.)
407	12934	G.B.	*Beryllium for X-Ray Metal Tests.* (Machinery, Vol. 62, No. 1,601, 17/6/43, p. 661.)
408	13040	G.B.	*Solubility of Metals in Mercury.* (Nature, Vol. 152, No. 3,847, 24/7/43, p. 108.)
409	13088	G.B.	*Treatment of Fusion Welds in Non-Ferrous Metals.* (Mechanical World, Vol. 114, No. 2,951, 23/7/43 p. 101.)

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410	13090	G.B.	...	*Lead in War.* (Times, Trade and Engg., Vol. 53, No. 953, July, 1943, p. 9.)
411	13097	U.S.A.	...	*Thermal Expansivity and Density of Iridium.* (P. Hidnert and M. G. Blair, J. of Research, National Bureau of Standards, Vol. 30, No. 6, June, 1943, pp. 427-433.)
412	13161	G.B.	...	*Report on Tin-Free Gear Bronze.* (Machinery, Vol. 63, No. 1,605, 15/7/43, p. 73.)
				Plastics and Resins.
413	12361	G.B.	...	*Anti-Personnel Hand Grenade, Made of Shock-Resisting Phenolic Resin (No. 69).* (Plastics, Vol. 7, No. 75, August, 1943, pp. 324, 327.)
414	12365	Germany	...	*Thermal Insulation with Iporka.* (From Wärme und Kaltetechn., 1941, Vol. 43, p. 153.) (Seiffert, Plastics, Vol. 7, No. 75, August, 1943, p. 334.)
415	12369	France	...	*Resistance of Polyvinylacetal Resins to Strong Alkali Solutions.* (Gibello, Plastics, Vol. 7, No. 75, August, 1943, p. 335.)
416	12371	Germany	...	*Complex Synthetic Resins.* (Plastics, Vol. 7, No. 75, August, 1943, p. 336.)
417	12372	Japan	...	*Constitution of Highly Polymerized Condensates, Especially of A.X.F.* (Plastics, Vol. 7, No. 75, August, 1943, p. 336.)
418	12373	Germany	...	*Quinone Inhibition of Styrene Polymerization.* (Plastics, Vol. 7, No. 75, August, 1943, p. 336.)
419	12375	France	...	*Pigment Plasticizer Combinations for Cellulose Lacquers.* (Plastics, Vol. 7, No. 75, August, 1943, p. 336.)
420	12376	G.B.	...	*Metallizing Plastics (Contd.).* (E. E. Halls, Plastics, Vol. 7, No. 75, August, 1943, pp. 337-348.)
421	12377	U.S.A.	...	*Sheet Plastics Seamed by Radio Current.* (Plastics, Vol. 7, No. 75, August, 1943, p. 349.)
422	12378	G.B.	...	*The Limitations of Plastics.* (D. W. Brown, Plastics, Vol. 7, No. 75, August, 1943, pp. 351-356.)
423	12379	G.B.	...	*Plastics in Building.* (Plastics, Vol. 7, No. 75, August, 1943, p. 356.)
424	12380	Germany	...	*New Tensile Test Piece for Plastics.* (From Schweizer Archiv., 1943, Vol. 8, No. 24.) (Frischmuth, Plastics, Vol. 7, No. 75, August, 1943, pp. 359-364.)
425	12381	G.B.	...	*Markers and Binders for Cables.* (Plastics, Vol. 7, No. 75, August, 1943, p. 367.)
426	12382	G.B.	...	*Resinoids and Other Plastics as Film Formers. XIX, Electrolytic Aspects of High Polymeric Systems.* (B. J. Brajnikoff, Plastics, Vol. 7, No. 75, August, 1943, pp. 368-372.)
427	12475	U.S.A.	...	*Progress in New Synthetic Textile Fibres.* (H. R. Mauersberger, A.S.T.M., No. 122, May, 1943, pp. 25-28.)

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428	12693	U.S.A.	...	*Plastic Tubing.* (Modern Plastics, Vol. 20, No. 7, March, 1943, p. 74.)
429	12696	U.S.A.	...	*Saran Used for Electroplating Masks.* (R. R. Bradshaw, Modern Plastics, Vol. 20, No. 7, March, 1943, pp. 78-79, 136.)
430	12697	U.S.A.	...	*Vinyl Compound Combats Corrosion* (" *Tygon* "). (Modern Plastics, Vol. 20, No. 7, March, 1943, pp. 85-868, 146.)
431	12701	U.S.A.	...	*Mechanic Tests of Cellulose Acetate.* (W. N. Findley, Modern Plastics, Vol. 20, No. 7, March, 1943, pp. 99-105, 138.)
432	12706	U.S.A.	...	*The Extension and Rupture of Cellulose Acetate and Celluloid.* (R. N. Hayward, Modern Plastics, Vol. 20, No. 7, March, 1943, p. 110.)
433	12823	U.S.A.	...	*Plastic Pipe and Power (Saran Pipe Utilized in Rectifying and Heat Exchange Installations in the Electrolytic Mass Production of Magnesium).* (Industrial Eng. Chemistry, Vol. 21, No. 13, 10/7/43, pp. 1052-1053.)
434	12825	U.S.A.	...	*Use of Lumarith on Windshields.* (Industrial Eng. Chemistry, Vol. 21. No. 13, 10/7/43, p. 1074.)
435	12826	U.S.A.	...	*Synthetic Mica (Polectron).* (Industrial Eng. Chemistry, Vol. 21, No. 13, 10/7/43, p. 1075.)
436	12829	U.S.A.	...	*Camouflage Paint.* (Industrial Eng. Chemistry, Vol. 21, No. 13, 10/7/43, p. 1076.)
437	12864	G.B. ...	...	*Synthetic Resins in the Paint Industry, II.* (Times Trade and Engineering, Vol. 53, No. 952, June, 1943, p. 10.)
438	12872	Canada	...	*Plastics—Developments in Canada.* (Times Trade and Engineering, Vol. 53, No. 952, June, 1943, p. 44.)
439	12907	G.B. ...	...	*Synthetic Resins in Papermaking.* (C. S. Maxwell, British Plastics, Vol. 15, No. 171, Aug., 1943, pp. 141-142.)
440	12908	G.B. ...	...	*Polyvinyl Resins as War Replacements.* (British Plastics, Vol. 15, No. 171, Aug., 1943, p. 142.)
441	12910	G.B. ...	...	*Pioneers in Plastics.* (British Plastics, Vol. 15, No. 171, Aug., 1943, pp. 146-148.)
442	12911	G.B. ...	..	*Heat-Sensitive Compounds for Temperature Measurement* (" *Tempilstiks* " *and* " *Tempilag* "). (British Plastics, Vol. 15, No. 171, Aug., 1943, p. 153.)
443	12913	G.B. ...	...	*Laminated Bearings in the Paper Industry* (" *Ryertex* " *Bearings*). (British Plastics, Vol. 15, No. 171, Aug., 1943, pp. 156-162.)
444	12914	G.B. ...	...	*Latest Cellulose Applications.* (British Plastics, Vol. 15, No. 171, Aug., 1943, pp. 164-165.)
445	12915	G.B. ...	...	*Methyl Cellulose. New Industrial Applications.* (British Plastics, Vol. 15, No. 171, Aug., 1943, pp. 168-170.)
446	12916	G.B. ...	...	*X-Ray Equipment Uses Plastics (Portable X-Ray Trailer for Inspection of Aircraft Parts).* (British Plastics, Vol. 15, No. 171, Aug., 1943, p. 171.)

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447	12917	G.B.	...	*Cold Moulded Plastics.* (J. Delmonte, British Plastics, Vol. 15, No. 171, Aug., 1943, pp. 174-177.)
448	12918	G.B.	...	*Vinyl Chloride Acetate Copolymers.* (J. D. Benedito, British Plastics, Vol. 15, No. 171, Aug., 1943, pp. 178-181.)
449	12919	G.B.	...	*New Type Plastic Material "Silicones."* (British Plastics, Vol. 15, No. 171, Aug., 1943, p. 181.)
450	13151	G.B.	...	*Substitute Materials.* (C. H. Desch, Nature, Vol. 152, No. 3,850, 14/8/43, p. 184.)
				Rubber (Nat. and Syn.).
451	12366	Germany	...	*Testing of Polyvinyl Chloride.* (Berger, Plastics, Vol. 7, No. 75, August, 1943, p. 334.)
452	12374	Germany	...	*New Methods for Working Polyvinyl Chloride.* (From Kunststoffe, 1942, Vol. 32, p. 137.) (Wick and Iloff, Plastics, Vol. 7, No. 75, August, 1943, p. 336.)
453	12704	U.S.A.	...	*Synthetic Rubber.* (H. I. Cramer, Modern Plastics, Vol. 20, No. 7, March, 1943, pp. 108, 142.)
454	12713	G.B.	...	*Rubber—Natural and Synthetic Supplies.* (C. Ridley, Automobile Engineer, Vol. 33, No. 439, Aug., 1943, pp. 334-337.)
455	12912	G.B.	...	*P.V.C. Cable as Substitute for Rubber Insulated Cable.* (British Plastics, Vol. 15, No. 171, Aug., 1943, p. 153.)
456	13007	U.S.A.	...	*Covered Sponge Rubber Gasket.* (Aero Digest, Vol. 42, No. 6, June, 1943, pp. 381-383.)
457	13091	Canada	...	*Synthetic Rubber Research in Canada.* (Times Trade and Engg., Vol. 53, No. 953, July, 1943, p. 15.)
458	13122	G.B.	...	*M.A.P. Two-Unit 5,340-Ton Rubber Die Press.* (Machinery, Vol. 63, No. 1,608, 5/8/43, pp. 141-146.)
				Wood and Plywood.
459	12384	G.B.	...	*Flexible Pressure in Veneer and Plywood Work.* (T. D. Perry, Engineer, Vol. 176, No. 4,570, 13/8/43, pp. 132-133.)
460	12417	G.B.	...	*High Frequency Heating in Plywood Manufacture.* (From Bulletin No. 6, June, 1943, of Aero Research, Ltd.) (Engineering, Vol. 156, No. 4,047, 6/8/43, pp. 116-117.)
461	12510	U.S.A.	...	*Aircraft Plywood.* (Mech. Eng., Vol. 65, No. 5, May, 1943, pp. 362-364.)
462	12804	U.S.A.	...	*An Analysis of the Factors Responsible for Raised Grain on the Wood of Oak following Sanding and Staining.* (G. G. Marra, Trans. A.S.M.E., Vol. 65, No. 3, April, 1943, pp. 177-185.)
463	12806	U.S.A.	...	*High Density Plywood.* (M. Finlayson, Trans. A.S.M.E., Vol. 65, No. 3, April, pp. 193-199.)
464	12807	U.S.A.	...	*Heating Wood with Radio Frequency Power.* (J. P. Taylor, Trans. A.S.M.E., Vol. 65, No. 3, April, 1943, pp. 201-212.)

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465	12882	G.B. ...	... *Ash Bark Beetle Damage (Affects Woods).* (R. C. Fisher, Aircraft Engineering, Vol. 15, No. 174, Aug., 1943, p. 244.)
466	12924	G.B. ...	... *Flexible Pressure in Veneer and Plywood Work.* (T. D. Perry, Engineer, Vol. 176, No. 4,571, 20/8/43, pp. 155-156.)
			Glass, Ceramics, Diamonds.
467	12411	G.B. ...	... *A Note on the Puncture Strength of Porcelain, etc.* (E. Rosenthal, Electronic Engineering, Vol. 15, No. 186, August, 1943, p. 130.)
468	12474	U.S.A.	... *Behaviour of Glazing Material Subjected to Explosion.* (F. W. Adams, A.S.T.M., No. 122, May, 1943, pp. 15-22.)
469	12487	U.S.A.	... *Glass for Workshop Gauges.* (Mechanical World, Vol. 114, No. 2,950, 16/7/43, pp. 76-78.)
470	12708	G.B. ...	... *Diamond Tools.* (Automobile Engineer, Vol. 33, No. 439, Aug., 1943, pp. 309-315.)
471	12828	U.S.A.	... *Plexiglas Cleaner.* (Industrial Eng. Chemistry, Vol. 21, No. 13, 10/7/43, p. 1076.)
472	13065	Canada	... *Canadian Synthetic Sapphires.* (L. B. Jackes, Canadian Aviation, Vol. 16, No. 6, June, 1943, pp. 114-115.)
473	13157	G.B. ...	... *Glass Gauges.* (Machinery, Vol. 63, No. 1,605, 15/7/43, p. 62.)
			Concrete and Cement.
474	12383	G.B. ...	... *Soil Cement Stabilisation.* (Engineer, Vol. 176, No. 4,570, 13/8/43, pp. 128-129.)
475	12413	G.B. ...	... *Tilting-Drum Concrete Mixer.* (Engineering, Vol. 156, No. 4,047, 6/8/43, p. 106.)
476	12477	U.S.A.	... *Discussion on Durability of Concrete.* (A.S.T.M., No. 122, May, 1943, pp. 40-42.)
477	12891	Germany	... *Cement as a Material for the Construction of Casting Moulds.* (From Die Giesserei, Vol. 29, No. 14, July, 1942, pp. 249-250.) (H. Goedal, Engineers' Digest, Vol. 4, No. 4, April, 1943, pp. 116-117.)
478	13118	U.S.A.	... *New Cement Replaces Riveting and Welding ("Cycleweld" Process).* (American Aviation, Vol. 7, No. 4, 15/7/43, p. 77.)
			General Properties of Metals, etc.
479	12418	G.B. ...	... *Mechanical Properties of Metals.* (A. C. Vivian, Engineering, Vol. 156, No. 4,047, 6/8/43, pp. 118-120.)
480	12421	G.B. ...	... *Explosives in the Working of Metals.* (A. Behr, Metal Industry, Vol. 63, No. 7, 13/8/43, p. 104.)
481	12735	G.B. ...	... *Metallurgical Abstracts (Vol. 10, Part 5, May, 1943, pp. 133-166).* (J. Inst. Metals, No. 5.)
482	12837	G.B. ...	... *Correspondence on Paper "New Methods for the Examination of Corroded Metal."* (J. of the Inst. of Metals, Vol. 69, No. 6, June, 1943, pp. 269-271.)

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483	12820	U.S.A. ...	*Post-War Products Planning—A Review of Raw Materials Sources.* (C. E. Williams, Industrial Eng. Chemistry (News Edition), Vol. 21, No. 13, 10/7/43, pp. 1035-1040.)
484	12821	U.S.A. ...	*The American Patent System.* (Industrial Eng. Chemistry (News Edition), Vol. 21, No. 13, 10/7/43, pp. 1041-1045.)
			B. Fabrication.
			Welding.
485	12360	G.B.	*The Welding of Plastics.* (Plastics, Vol. 7, No. 75, August, 1943, p. 326.)
486	12424	G.B.	*Aluminium Spot Welding Faults.* (Metal Industry, Vol. 63, No. 7, 13/8/43, p. 108.)
487	12514	U.S.A. ...	*Report on the All-Welded Tanker SS. Schnectady.* (Mech. Eng., Vol. 65, No. 5, May, 1943, pp. 365-366.)
488	12517	U.S.A. ...	*Low Temperature Salvage Welding of Defective Castings (Cestolin Eutectic Process).* (Mech. Eng., Vol. 65, No. 5, May, 1943, pp. 26-27.)
489	12518	U.S.A. ...	*New Electronic Control for Resistance Welding of Aluminium (General Electric).* (Mech. Eng., Vol. 65, No. 5, May, 1943, p. 23.)
490	12536	G.B.	*Condenser-Type Spot Welding of Light Alloys.* (T. M. Roberts, Aircraft Prod., Vol. 5, No. 57, July, 1943, pp. 338-343.)
491	12672	G.B.	*Welding by Aromic Hydrogen.* (Sheet Metal Industries, Vol. 17, No. 195, July, 1943, pp. 1235-1238, 1241.)
492	12673	G.B.	*The Welding of Stainless Steels.* (Sheet Metal Industries, Vol. 17, No. 198, July, 1943, p. 1241.)
493	12674	G.B.	*Weld Finishing.* (E. G. West, Sheet Metal Industries, Vol. 17, No. 195, July, 1943, pp. 1242-1250.
494	12677	Switzerland ...	*Spot Welding of Aluminium and Aluminium Alloy Sheet Metal with a 60 K.V.A. Machine.* (R. Irmann, from Schweizerische Bauzeitung, Vol. 120, No. 16, Oct. 17, 1942, pp. 179-183. (Engineers' Digest, Vol. 4, No. 3, March, 1943, pp. 70-73.)
495	12886	U.S.A. ...	*Resistance Welds with Electronic Control.* (T. R. Lawson, Engineers' Digest, Vol. 4, No. 4, April, 1943, pp. 104-107.)
496	12894	Germany ...	*New Devices for Holding the Material in Electric Butt and Flash Welders.* (From Werkstatt und Betrieb., Vol. 75, No. 6, June, 1942, pp. 129-130. (P. Florian, Engineers' Digest, Vol. 4, No. 4, April, 1943, pp. 119-121.)
497	12945	Switzerland ...	*Gas Welding, Arc Welding and Atomic Hydrogen Welding of Aluminium.* (Herrmann and Zurbrügg, Light Metals, Vol. 6, No. 63, April, 1943, pp. 180-188.)
498	12997	U.S.A. ...	*Arc Welded Tubular Jigs.* (R. H. Holmes, Aero Digest, Vol. 42, No. 6, June, 1943, pp. 301-306.

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499	13148	G.B.	*Recent Developments in Welding.* (C. W. Brett, Institute of Petroleum, Vol. 29, No. 234, June, 1943, pp. 157-162.)
			Machining, Grinding.
500	12419	G.B.	*Machining Copper and its Alloys—I.* (Metal Industry, Vol. 63, No. 7, 13/8/43, pp. 98-100.)
501	12900	G.B.	*Machining Copper and its Alloys—II.* (Metal Industry, Vol. 63, No. 8, 20/8/43, pp. 118-120.)
502	12939	G.B.	*Profile Grinding and Profile Grinding Machines.* (Machinery, Vol. 62, No. 1,600, 10/6/43, pp. 635-636.)
503	13134	G.B.	*Free Machining Nickel Alloy ("Invar").* (Machinery, Vol. 62, No. 1,602, 24/6/43, p. 696.)
504	13162	G.B.	*Securing Fine Surface Quality by Grinding.* (H. J. Wills, Machinery, Vol. 63, No. 1,605, 15/7/43, pp. 75-76.)
			Surface Protection.
505	12414	G.B.	*Recent Advances in Protective Coatings.* (Engineering, Vol. 156, No. 4,047, 6/8/43, p. 109.)
506	12515	U.S.A. ...	*Surface Finish of Journals, as Affecting Friction Wearing-in and Seizure of Bearings (Discussion on Paper).* (Mech. Eng., Vol. 65, No. 5, May, 1943, pp. 367-371.)
507	12729	G.B.	*Heat Resisting and Storing Finishes.* (R. L. Frost, Chemistry and Industry, Vol. 62, No. 33, 14/8/43, pp. 306-310.)
508	12827	U.S.A. ...	*Plating Extends Gauge Life.* (Industrial Eng. Chemistry, Vol. 21, No. 13, 10/7/43, p. 1075.)
509	12839	G.B.	*Correspondence on Paper "The Surface Protection of Magnesium Alloys."* (J. of the Inst. of Metals, Vol. 69, No. 6, June, 1943, pp. 273-274.)
510	12902	G.B.	*Chromium Plating of Dies and Tools.* (D. A. Cotton, Metal Industry, Vol. 63, No. 8, 20/8/43, pp. 122-124.)
511	12941	G.B.	*Nature and Uses of Metallic Naphthenates as Protective Films and Sealing Compounds in Metallurgy.* (Light Metals, Vol. 6, No. 63, April, 1943, pp. 164-165.)
512	12943	G.B.	*Oxidation Protection of Magnesium (Use of Steam and Free Oxygen).* (Light Metals, Vol. 6, No. 63, April, 1943, pp. 169-171.)
513	12951	G.B.	*Practical Data on the Chromic Acid Anodizing Process.* (Light Metals, Vol. 6, No. 62, March, 1943, pp. 115-122.)
514	12957	U.S.S.R. ...	*Electro-Deposition of Light Metals from Non-Aqueous Solutions (Contd.).* (M. A. Klochko, Light Metals, Vol. 6, No. 64, May, 1943, pp. 254-258.)
515	12958	G.B.	*R.A.E. Chromate Treatment.* (Light Metals, Vol. 6, No. 64, May, 1943, p. 238.)
516	12960	G.B.	*Painting Aluminium by Roller Coating.* (Light Metals, Vol. 6, No. 60, Jan., 1943, pp. 18-19.)

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			Heat Treatment.
517	12386	G.B.	*High Frequency Heating of the Non-Metallic Materials.* (Engineer, Vol. 176, No. 4,570, 13/8/43, p. 134.)
518	12668	G.B.	*Application of Radiant Heat to Metal Finishing.* (J. H. Nelson and H. Silman, Sheet Metal Industries, Vol. 17, No. 195, July, 1943, pp. 1213-1225, 1228.)
519	12678	Germany ...	*The Technique of Melting and the Casting Properties of Aluminium and Aluminium Alloys.* (From Die Giesserei, Vol. 29, No. 17, Aug., 1942, pp. 285-291.) (H. Roehrig, Engineers' Digest, Vol. 4, No. 3, March, 1943, pp. 73-75.)
520	12768	U.S.A. ...	*Blast Furnace Refractions.* (R. E. Birch, Metal Progress, Vol. 43, No. 6, June, 1943, pp. 932-934.)
521	12836	G.B.	*The Effect of Quenching and Prolonged Tempering on a Base Antimony-Cadmium-Tin Alloys. II—Changes in Tensile Properties.* (W. T. Pell-Walpole, J. of the Inst. of Metals, Vol. 69, No. 6, June, 1943, pp. 259-268.)
522	12865	G.B.	*Heat Insulation—Methods and Materials.* (Times Trade and Engineering, Vol. 53, No. 952, June, 1943, p. 28.)
523	12874	G.B.	*Metals at High Temperatures.* (N. A. de Bruyne, Aircraft Engineering, Vol. 15, No. 174, Aug., 1943, pp. 223-226.)
524	12881	G.B.	*Infra-Red Industrial Lamps.* (Aircraft Engineering, Vol. 15, No. 174, Aug., 1943, pp. 242-243.)
525	12890	Germany ...	*The Use of the Cupola Furnace for Metallurgical Purposes in the Melting of Cast Iron.* (From Die Giesserei, Vol. 29, No. 14, July, 1942, pp. 237-243.) (H. Kopp, Engineers' Digest, Vol. 4, No. 4, April, 1943, pp. 115-117.)
526	12898	G.B.	*Metallurgical Factors in the Founding of Aluminium Alloys (Contd.).* (Metal Industry, Vol. 63, No. 8, 20/8/43, pp. 114-117.)
527	12932	G.B.	*The Infra-Red Process in Industry.* (Machinery, Vol. 62, No. 1,601, 17/6/43, pp. 660-661.)
528	12955	G.B.	*System of Control for Aluminium Foundries.* (F. A. Allen and others, Light Metals, Vol. 6, No. 64, May, 1943, pp. 222-236.)
			Moulding and Casting.
529	12368	Germany ...	*Dies for Deep Injection Mouldings.* (From Kunststoffe, 1942, Vol. 32, p. 311.) (Gastrow, Plastics, Vol. 7, No. 75, August, 1943, p. 335.)
530	12370	Germany ...	*Dimensions of Moulds for Thermo-Setting Resins.* (From Kunststoffe, 1942, Vol. 32, p. 217.) (Weprek, Plastics, Vol. 7, No. 75, August, 1943, pp. 335-336.)
531	12698	U.S.A. ...	*Heatronic Moulding—New Technique for Rapid Moulding of Thermo-Setting Plastics.* (V. E. Meharg, Modern Plastics, Vol. 20, No. 7, March, 1943, pp. 87-90.)

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532	12699	U.S.A. ...	*Paper Laminates for Moulding.* (H. J. Luth, Modern Plastics, Vol. 20, No. 7, March, 1943, pp. 91, 138-140.)
533	12885	Germany ...	*Threads in Plastic Mouldings.* (From Kunststoffe, Vol. 32, No. 6, June, 1942, pp. 171-180.) (A. Thum, Engineers' Digest, Vol. 4, No. 4, April, 1943, pp. 101-104.)
534	12901	G.B.	*Heading and Gating of Aluminium and Magnesium Castings.* (Metal Industry, Vol. 63, No. 8, 20/8/43, p. 120.)
535	12903	G.B.	*Infra-Red Drying of Sand Moulds.* (Metal Industry, Vol. 63, No. 8, 20/8/43, p. 113.)
536	12906	G.B.	*Injection Moulds—Pt. II.* (British Plastics, Vol. 15, No. 171, Aug., 1943, pp. 133-140.)
537	12966	G.B.	*Recovery of Defective Pressure Castings.* (Light Metals, Vol. 6, No. 60, Jan., 1943, p. 31.)
538	13028	U.S.A. ...	*Development of a Cast Resin Stretch Press Die.* (L. J. Jaworski, Aero Digest, Vol. 42, No. 4, April, 1943, pp. 230-235.)
539	13052	G.B.	*Rubber Economy by Introducing Felt Core in Rubber Moulding (Felt Moulding Process).* (Aircraft Production, Vol. 5, No. 54, April, 1943, p. 175.)
540	13082	G.B.	*Centrifugal Steel Casting.* (C. K. Donoho, Mechanical World, Vol. 114, No. 2,952, 30/7/43, pp. 117-119.)
541	13096	G.B.	*Heatronic Moulding of Plastics.* (V. E. Yarsley, Times Trade and Engg., Vol. 53, No. 953, July, 1943, p. 44.)
542	13133	G.B.	*The Location of Inserts in Die Casting Dies—II.* (H. K. Barton, Machinery, Vol. 62, No. 1,602, 24/6/43, pp. 694-696.)
543	13158	G.B.	*Centrifugal Casting.* (Machinery, Vol. 63, No. 1,605, 15/7/43, p. 64.)
			Soldering and Brazing.
544	12809	G.B.	*Hints on Brazing.* (Metal Industry, Vol. 63, No. 8, 20/8/43, p. 117.)
545	12929	G.B.	*Tipping Molybdenum by Braze-Hardening.* (Machinery, Vol. 62, No. 1,599, 3/6/43, pp. 607-608.)
546	12959	G.B.	*Soldering Aluminium Alloys.* (Light Metals, Vol. 6, No. 60, Jan., 1943, pp. 5-18.)
			Drawing and Rolling.
547	12484	U.S.A. ...	*Steel Cartridge Cases.* (Mechanical World, Vol. 114, No. 2,950, 16/7/43, p. 65.)
548	12643	G.B.	*Two-Stage Drawing of Cylindrical Cups.* (H. W. Swift, Engineering, Vol. 156, No. 4,048, 13/8/43, pp. 137-140.)
549	12659	Germany ...	*Cold and Hot Rolling of Metals..* (*R.T.P.3 Translation No.* 1,735.) (O. Emicke and K. H. Lucas, Sheet Metal Industries, Vol. 17, No. 195, July, 1943, pp. 1159-1162.)

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550	12661	G.B.	*Two-Stage Drawing of Cylindrical Cups.* (H. W. Swift, Sheet Metal Industries, Vol. 17, No. 195, July, 1943, pp. 1179-1193.)
551	12671	G.B.	*Drawing Steel Cartridge Cases.* (G. S. Gardner, Sheet Metal Industries, Vol. 17, No. 195, July, 1943, p. 1229.)
552	12764	U.S.A. ...	*Steel Cartridge Cases from Extended Cups.* (R. B. Schenck, Metal Progress, Vol. 43, No. 6, June, 1943, pp. 912-916.)
553	12858	U.S.A. ...	*New Developments in Cold Drawing of Steel.* (Automotive Industries, Vol. 89, No. 2, 15/7/43, p. 96.)
554	13121	G.B.	*Deep Drawing Research. Two-Stage Drawing of Cylindrical Cups.* (H. W. Swift, I.A.E. Report, No. 1,943-10, June, 1943, pp. 196-279.)
			Stamping, Pressing, Etching.
555	12880	G.B.	*A New Method of Etching on Metal.* (Aircraft Engineering, Vol. 15, No. 174, Aug., 1943, p. 241.)
556	12895	Germany ...	*Automatic Devices Aid Stamping and Pressing.* (E. Vergen, Engineers' Digest, Vol. 4, No. 4, April, 1943, pp. 121-123.)
			Joining and Bonding.
557	12529	G.B.	*Plastic Bonding of Metals (The Redux Process).* (Aircraft Prod., Vol. 5, No. 57, July, 1943, pp. 313-314.)
558	12660	G.B.	*The Joining and Protection of Metals.* (D. G. P. Paterson, Sheet Metal Industries, Vol. 17, No. 195, July, 1943, pp. 1163-1168, 1176.)
559	12666	G.B.	*The Redux Process for Bonding Metals.* (Sheet Metal Industries, Vol. 17, No. 195, July, 1943, pp. 1209-1232.)
560	12954	G.B.	*Joining Light Alloys with Adhesives (Redux Process).* (Light Metals, Vol. 6, No. 64, May, 1943, pp. 219-221.)
561	13047	G.B.	*Accelerating Wood Bonding (Use of Electric Heating with Synthetic Resin Adhesives).* (Aircraft Production, Vol. 5, No. 54, April, 1943, p. 171.)
			Pickling and Desealing and Annealing.
562	12489	G.B.	*Pickling and Annealing Brass.* (Mechanical World, Vol. 114, No. 2,950, 16/7/43, pp. 81-82.)
563	12662	G.B.	*Descaling and Pickling Processes (Pt. II).* (H. Silman, Sheet Metal Industries, Vol. 17, No. 195, July, 1943, pp. 1199-1205.)
			Riveting and Boring.
564	12923	G.B.	*"Centerscope" for Accurate Setting for Precision Boring.* (Engineer, Vol. 176, No. 4,571, 20/8/43, p. 154.)
565	12942	Switzerland ...	*Problems in Riveting Light Alloy Sheet.* (Light Metals, Vol. 6, No. 63, April, 1943, pp. 166-168.)

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				Machines and Tools.
566	12485	G.B.	... ...	*Precision Automatic Machine Tool Operation (an Interchangeable Electro-Hydraulic Duplicating Control for Operating Machine Tool Spindles).* (Mechanical World, Vol. 114, No. 2,950, 16/7/43, pp. 72-75.)
567	12710	G.B.	... ...	*Development and Application of Thread Grinding Machines.* (Automobile Engineer, Vol. 33, No. 439, Aug., 1943, pp. 317-320.)
568	12765	U.S.A.	...	*Selection of Tool Steel by its Hardenability (including Data Sheet).* (S. M. de Poy, Metal Progress, Vol. 43, No. 6, June, 1943, pp. 917-918.)
569	12793	U.S.A.	...	*Hi-Shear Rivet Saves Weight.* (Flying and Industrial Aviation, Vol. 32, No. 4, April, 1943, p. 112.)
570	12853	U.S.A.	...	*A New Method of Tool Finishing.* (Automatic Industries, Vol. 89, No. 2, 15/7/43, p. 68.)
571	12887	G.B.	... ...	*Press Equipped with Electro-Static High Frequency Heating for Bonding Plastic Materials.* (P. D. Zottu, Engineers' Digest, Vol. 4, No. 4, April, 1943, pp. 107-111.)
572	12928	G.B.	... ...	*Adjustable Form-Turning Tools.* (Machinery, Vol. 62, No. 1,599, 3/6/43, pp. 605-606.)
573	12931	G.B.	... ...	*Punches and Punching Operations.* (J. Garland, Machinery, Vol. 62, No. 1,601, 17/6/43, pp. 652-658.)
574	12936	G.B.	... ...	*Loading Chart for Rivet-Making Machines.* (R. Fleischmann, Machinery, Vol. 62, No. 1,600, 10/6/43, p. 623.)
575	12948	G.B.	... ...	*Cutting Tool Life and Efficiency.* (Light Metals, Vol. 6, No. 63, April, 1943, pp. 203-206.)
576	13126	G.B.	... ...	*Spindle Bearings for Machine Tools.* (G. Schlesinger, Machinery, Vol. 63, No. 1,608, 5/8/43, pp. 158-160.)
577	13129	G.B.	... ...	*Recommended Tool Angles, Feeds, Speeds, etc., for Machining with Cemented Carbide Tools.* (Machinery, Vol. 62, No. 1,602, 24/6/43, p. 679.)
578	13159	G.B.	... ...	*Form Relieving Milling Cutters.* (Machinery, Vol. 63, No. 1,605, 15/7/43, pp. 66-67.)
579	13160	G.B.	... ...	*Shear Tools for Interrupted Cutting.* (Machinery, Vol. 63, No. 1,605, 15/7/43, pp. 69-71.)
				C. Inspection.
				General, including Interchangeability.
580	12530	G.B.	... ...	*The Inspection of Steel Forgings.* (Aircraft Prod., Vol. 5, No. 57, July, 1943, p. 314.)
581	12556	U.S.A.	...	*Testing War Equipment.* (G. M. Barnes, S.A.E. Journal, Vol. 51, No. 1, July, 1943, pp. 21-23, 50.)
582	12562	U.S.A.	...	*Progress in Precision—Inspection Methods in the Automotive Industry.* (O. J. Snider, S.A.E. Journal, Vol. 51, No. 1, July, 1943, pp. 65-66.)
583	13050	G.B.	... ...	*Quality Control.* (W. A. Bennett and J. W. Rodgers, Aircraft Production, Vol. 5, No. 54, April, 1943, pp. 172-175.)

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			Mechanical Tests.
584	12478	U.S.A. ...	*Complete List of A.S.T.M. Emergency Specifications and Emergency Alternative Provisions.* (A.S.T.M., No. 122, May, 1943, pp. 56-57.)
585	12702	U.S.A. ...	*Long Time Tension Test of Plastics.* (Modern Plastics, Vol. 20, No. 7, March, 1943, pp. 106, 144.)
586	12996	U.S.A. ...	*Testing Transparent Plane Sections Under Operating Conditions.* (Aero Digest, Vol. 42, No. 6, June, 1943, pp. 295-299.)
			Chemical Analysis.
587	12774	U.S.A. ...	*Chemical Analysis by Colorimeter.* (Metal Progress, Vol. 43, No. 6, June, 1943, p. 910.)
588	12944	Switzerland ...	*Routine Analysis of Aluminium Alloys.* (Light Metals, Vol. 6, No. 63, April, 1943, pp. 175-179.)
			Optical Methods and Electro-Optics.
589	12663	G.B.	*"Hyglo" Process of Crack Detection.* (Sheet Metal Industries, Vol. 17, No. 195, July, 1943, p. 1207.)
590	12730	G.B.	*Electron Diffraction.* (G. P. Thomson, J. Inst. Metals, Vol. 69, No. 5, May, 1943, pp. 191-199.)
591	12771	U.S.A. ...	*Use of Spectrograph for Analysis of Residual Alloys in Scrap.* (Metal Progress, Vol. 43, No. 6, June, 1943, p. 944.)
592	12933	G.B.	*Locating Holes with Gauge Blocks and Microscope.* (Machinery, Vol. 62, No. 1,601, 17/6/43, p. 661.)
593	12953	G.B.	*High Temperature Microscopy and Photomicrography for the Examination of Metals and Refactories.* (H. W. Greenwood, Light Metals, Vol. 6, No. 62, March, 1943, pp. 124-133.)
594	12961	Germany ...	*Election Microscope Studies of Aluminium Surfaces.* (Semmler, Light Metals, Vol. 6, No. 60, Jan., 1943, pp. 20-24.)
			Electrical and Magnetic Methods and X-Ray Analysis.
595	12385	G.B.	*X-Ray Counting Tubes.* (Engineer, Vol. 176, No. 4,570, 13/8/43, p. 134.)
596	12844	U.S.A. ...	*Basic Principles of X-Ray Diffraction.* (R. Taylor, Automotive Industries, Vol. 89, No. 2, 15/7/43, pp. 28-30.)
597	12968	Germany ...	*Determining Tin in Secondary Aluminium Vibration of Overhead Transmission.* (Steinhäuser and Aust, Light Metals, Vol. 6, No. 60, Jan., 1943, p. 32.)
598	12970	G.B.	*X-Rays and the Light Metal Industry.* (E. J. Tunnicliffe, Light Metals, Vol. 6, No. 60, Jan., 1943, pp. 38-46.)
			INSTRUMENTS.
			Electrical, Electronic, etc.
599	12639	G.B.	*The Cathode Ray Oscillograph in Industry (Book Review).* (W. Wilson, Engineering, Vol. 156, No. 4,048, 13/8/43, p. 124.)

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600	12688	Germany ...	*Remote Transmission and Recording of Torque, Speed and Power.* (From A.T.Z., Vol. 45, No. 7, April 10, 1942, pp. 191-192.) (Engel, Engineers' Digest, Vol. 4, No. 3, March, 1943, p. 96.)
601	12892	U.S.S.R. ...	*A Photo-Magnetic Defectoscope.* (Zavodskaja Laboratoria, Moscow, Vol. 10, No. 3, March, 1941, pp. 279-281.) (M. M. Sliozberg, Engineers' Digest, Vol. 4, No. 4, April, 1943, pp. 117-118.)
602	12995	U.S.A. ...	*Electric Torque Meters for Aircraft Engines.* (R. L. Findley, Aero Digest, Vol. 42, No. 6, June, 1942, pp. 285-291, 339.)
603	13084	G.B.	*Telemetering of Fluids—II.* (Mechanical World, Vol. 114, No. 2,952, 30/7/43, pp. 133-136.)
604	13085	G.B.	*Telemetering of Fluids—the Distant Transmission of Industrial Readings.* (Mechanical World, Vol. 114, No. 2,951, 23/7/43, pp. 88-89.)
605	13676	U.S.A. ...	*New Electronic Meter (Gen. Electric Co.) Measures Extremely Short Time Intervals.* (Mech. Engg., Vol. 65, No. 6, June, 1943, pp. 28-29.)
			Mechanical, Physical, etc.
606	12498	Canada ...	*Needle Bearings for Aircraft Uses.* (H. W. Haynes, Canadian Aviation, Vol. 16, No. 4, April, 1943, pp. 120-122.)
607	12665	G.B.	*A Circular Slide Rule for Rapid Determination of Manometer Pressure on Hydraulic Presses Using Rubber Dies.* (Sheet Metal Industries, Vol. 17, No. 195, July, 1943, pp. 1208-1228.)
608	12630	U.S.A. ...	*New Thermometer.* (American Aviation, Vol. 6, No. 24, 15/5/43, p. 57.)
609	12700	U.S.A. ...	*Steps for Prolonging Instrument Life.* (T. A. Cohen, Modern Plastics, Vol. 20, No. 7, March, 1943, pp. 96-97, 142.)
610	12976	U.S.A. ...	*New System of Spare Parts Selection Aids Production and Field Servicing of Aircraft Instruments.* (H. N. Droge, Aero Digest, Vol. 42, No. 6, June, 1943, pp. 151-153.)
611	13112	U.S.A. ...	*Sperry's Automatic Computing Sight (for .50 Calibre Machine Guns).* (American Aviation, Vol. 7, No. 4, 15/7/43, p. 26.)
			PRODUCTION.
			Organisation and Control.
612	12358	U.S.A. ...	*U.S.A. Aircraft Production, 1942 and 1943.* (Inter. Avia., No. 871, 26/5/43, pp. 17-18.)
613	12533	G.B.	*Regional Production Organisation.* (Aircraft Prod., Vol. 5, No. 57, July, 1943, p. 329.)
614	12615	U.S.A. ...	*National Aircraft War Production Council to Aid U.S. Industry.* (American Aviation, Vol. 6, No. 23, 1/5/43, pp. 13, 16-17, 62.)
615	12667	G.B.	*Production Control.* (A. J. Milne, Sheet Metal Industries, Vol. 17, No. 195, July, 1943, pp. 1210-1212.)
616	12695	Canada ...	*Canada's Plastics Industry in War Time.* (H. McCann, Modern Plastics, Vol. 20, No. 7, March, 1943, pp. 76-77, 154.)

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617	12808	U.S.A. ...	*Ten Years' Progress in Management, Purchasing, Inspection, Statistical Control, Standardization, Marketing, etc.* (Trans. A.S.M.E., Vol. 65, No. 3, April, 1943, pp. 213-260.)
618	12830	U.S.A. ...	*Nazi Heavy Industry.* (Industrial Eng. Chemistry, Vol. 21, No. 13, 10/7/43, p. 1116.)
619	12971	Switzerland ...	*Swiss Aluminium Industry on Wartime Basis.* (Light Metals, Vol. 6, No. 60, Jan., 1943, pp. 47-52.)
620	12978	U.S.A. ...	*Flow of Material Through Official Warehouses.* (Aero Digest, Vol. 42, No. 6, June, 1943, pp. 156-159.)
621	12991	U.S.A. ...	*Curtiss-Wright Production Drive (Posters, Propaganda, etc.).* (Aero Digest, Vol. 42, No. 6, June, 1943, pp. 237-240, 339.)
622	12999	U.S.A. ...	*The Split Shift as a Solution of the Manpower Problem.* (B. R. Otto, Aero Digest, Vol. 42, No. 6, June, 1943, pp. 313, 438.)
623	13015	U.S.A. ...	*Control of Absenteeism in Industry.* (L. V. Spencer, Aero Digest, Vol. 42, No. 4, April, 1943, pp. 135-136, 157-159, 278-290.)
624	13019	U.S.A. ...	*Efficient Production Management Achieved by Careful Controls (Pt. I).* (C. H. Speck, Aero Digest, Vol. 42, No. 4, April, 1943, pp. 184-186, 207-208.)
625	13038	U.S.A. ...	*The Furniture Industry Mobilised for Aircraft Production.* (Aero Digest, Vol. 42, No. 4, April, 1943, pp. 145-157.)
626	13046	G.B.	*Selection of Labour.* (Aircraft Production, Vol. 5, No. 54, April, 1943, pp. 170-171.)
627	13066	Canada ...	*Directory of Sources of Supply for the Aircraft Industry in Canada.* (Canadian Aviation, Vol. 16, No. 6, June, 1943, pp. 119-182.)
628	13070	U.S.A. ...	*Absenteeism Under Control at Vultee.* (A. R. Baish, Automotive Industries, Vol. 88, No. 12, 15/6/43, pp. 22-24, 74.)
			Research and Training.
629	12357	U.S.A. ...	*Curtiss-Wright New Laboratories.* (Inter. Avia., No. 871, 26/5/43, p. 16.)
630	12415	G.B.	*Research at the I.A.E.* (Engineering, Vol. 156, No. 4,047, 6/8/43, p. 109.)
631	12656	G.B.	*Industrial Research in Great Britain. A Policy for the Future.* (P. Dunsheath, Civil Engineering, Vol. 38, No. 441, March, 1943, p. 46.)
632	12675	G.B.	*The Training of Physicists (Report).* (Sheet Metal Industries, Vol. 17, No. 195, July, 1943, p. 1232.)
633	12824	U.S.A. ...	*Goodyear's New Research Laboratory. Korseal Sheet (Plasticised Polyvinyl Chloride) as Insulator for Chrome Hardening Surfaces of Engine Cylinders, etc.* (F. J. Van Antwerpen, Industrial Eng. Chemistry, Vol. 21, No. 13, 10/7/43, pp. 1056-1059, 1074.)

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			Aircraft Production Methods.
634	13074	U.S.A.	... *Curtiss-Wright New Research Laboratory.* (W. E. Voisine, Automotive Industries, Vol. 88, No. 12, 15/6/43, pp. 38-39, 60.)
635	13101	U.S.A.	... *Research and the War Effort in the U.S.A.* (Engineers' Digest, Vol. 4, No. 5, May, 1943, pp. 131-133.)
636	13152	G.B. ...	... *Natural Policy of Technical Education (Pamphlet).* (Nature, Vol. 152, No. 3,850, 14/8/43, p. 184.)
637	12453	G.B. ...	... *De Havillands on Airscrew Surgery.* (Aeroplane, Vol. 65, No. 1,676, 9/7/43, pp. 32, 46-48.)
638	12526	U.S.A.	... *Aircraft Plywood and its Finishing Requirements—Pt. IV.* (C. A. Carter, Commercial Aviation, Vol. 5, No. 4, April, 1943, pp. 120-122.)
639	12527	U.S.A.	... *Increased Production of Aircraft Tubing.* (Commercial Aviation, Vol. 5, No. 4, April, 1943, pp. 124-126.)
640	12528	G.B. ...	... *Producing Bomber Castings—Pt. II.* (J. A. Oates, Aircraft Prod., Vol. 5, No. 57, July, 1943, pp. 307-312.)
641	12541	U.S.A.	... *Ford Liberator Production.* (Aircraft Prod., Vol. 5, No. 57, July, 1943, pp. 347-349.)
642	12590	Canada	... *Canadian Production of Trainers (P.T. 23, P.T. 26, Cornell).* (Canadian Aviation, Vol. 16, No. 3, March, 1943, pp. 46-52.)
643	12595	Canada	... *Decalcomania Transfers Used on Aircraft (Roundels, Lettering, etc.).* (Canadian Aviation, Vol. 16, No. 3, March, 1943, pp. 91-92, 102.)
644	12618	U.S.A.	... *New Greaseproof Paper for Protecting Metal Parts.* (American Aviation, Vol. 6, No. 23, 1/5/43, p. 53.)
645	12669	G.B. ...	... *Avoiding Weak Points in Aircraft Construction.* (A. Dickason, Sheet Metal Industries, Vol. 17, No. 195, July, 1943, pp. 1226-1228.)
646	12843	U.S.A.	... *Douglas Inspection System.* (C. C. Harrison, Automotive Industries, Vol. 89, No. 2, 15/7/43, pp. 24-25, 92.)
647	12847	U.S.A.	... *Mechanized Assembly Line to Double Output of P. 38 Fighters.* (R. R. Kay, Automotive Industries, Vol. 89, No. 2, 15/7/43, pp. 32-33, 82-85.)
648	12848	U.S.A.	... *Separation Method Increases Liberator Nose Section Output.* (Automotive Industries, Vol. 89, No. 2, 15/7/43, pp. 34-35, 85.)
649	12920	G.B. ...	... *Aircraft Production (10th Report of Select Committee on National Expenditure).* (Engineer, Vol. 176, No. 4,511, 20/8/43, pp. 143-144.)
650	12950	G.B. ...	... *Industrial Radiographic Technique.* (H. E. Seamann, Light Metals, Vol. 6, No. 62, March, 1943, pp. 113-114.)
651	13006	U.S.A.	... *Reducing Time for Assembling a Wing Flap Actuating Cylinder by Precision Built Jig.* (Aero Digest, Vol. 42, No. 6, June, 1943, pp. 355-357.)
652	13020	U.S.A.	... *"Power Packages" for Aircraft (Electrically Operated Accessories).* (J. J. Horan, Aero Digest, Vol. 42, No. 4, April, 1943, pp. 194-197, 420.)

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653	13029	U.S.A. ...	*Radiography of Aircraft Castings.* (R. Taylor, Aero Digest, Vol. 42, No. 4, April, 1943, pp. 238-240, 264-265.)
654	13036	U.S.A. ...	*Production Short Cuts.* (Aero Digest, Vol. 42, No. 4, April, 1943, pp. 336-344.)
655	13042	G.B.	*Plastic Finishes (Runeslite Processes).* (Aircraft Production, Vol. 5, No. 54, April, 1943, p. 158.)
656	13043	G.B.	*Avro Lancaster, Pt. IV (Final Assembly).* (Aircraft Production, Vol. 5, No. 54, April, 1943, pp. 159-165.)
657	13049	U.S.A. ...	*An Overhead Conveyor (Glenn Martin System).* (Aircraft Production, Vol. 5, No. 54, April, 1943, p. 200.)
658	13064	Canada ...	*Spot Welding in Design and Production of Aircraft —Pt. II.* (G. S. Mikhalapov, Canadian Aviation, Vol. 16, No. 6, June, 1943, pp. 111-114.)
659	13069	U.S.A. ...	*Vega Engineering Simplifies Production Methods.* (R. A. Trumpis, N. Irwin, Automotive Industries, Vol. 88, No. 12, 15/6/43, pp. 20-21, 94.)
660	13156	G.B.	*Assembly Operations in the Manufacture of the Jerrican (Petrol Container).* (Machinery, Vol. 63, No. 1,605, 15/7/43, pp. 57-62.)

Production Methods for Engines, Instruments, etc.

661	12521	U.S.A. ...	*Studebaker Builds Wright Cyclones.* (Commercial Aviation, Vol. 5, No. 4, April, 1943, pp. 89-90.)
662	12621	U.S.A. ...	*Conveyor Belt Production of Curtiss Electric Propellers (Photograph).* (American Aviation, Vol. 6, No. 23, 1/5/43, p. 58.)
663	12751	U.S.A. ...	*Centrifugal Casting Saves Time on Engine Cylinders.* (American Aviation, Vol. 7, No. 2, 15/6/43, p. 64.)
664	12849	U.S.A. ...	*Production of Piston Rings (Description of Plant and Methods of Production).* (J. Geschelin, Automotive Industries, Vol. 89, No. 2, 15/7/43, pp. 36-40, 90.)
665	12889	Germany ...	*Turbo Compressors in the Metallurgical Industry.* (From Stahl and Eisen, Vol. 62, Nos. 28-29, July 9 and 16, 1942, pp. 588-591, 608-612.) (F. Kluge, Engineers' Digest, Vol. 4, No. 4, April, 1943, pp. 113-115.)
666	12925	G.B.	*Fine Pitch Thread Production.* (Machinery, Vol. 62, No. 1,599, 3/6/43, p. 595.)
667	12926	G.B.	*Operations in the Production of a Sub-Machine Gun.* (Machinery, Vol. 62, No. 1,599, 3/6/43, pp. 596-597.)
668	12930	G.B.	*Operations in Submarine Chaser Engine Production.* (Machinery, Vol. 62, No. 1,601, 17/6/43, pp. 645-649.)
669	12981	U.S.A. ...	*New Ford Tractor Operating Propeller Hoist (for Removing or Mounting Propellers).* (Aero Digest, Vol. 42, No. 6, June, 1943, p. 176.)
670	12988	U.S.A. ...	*Surface Finishing Methods for Aircraft Engines.* (F. M. Reck, Aero Digest, Vol. 42, No. 6, June, 1943, pp. 213-217.)

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671	13005	U.S.A. ...	*Specially Designed Cutters Boost Cylinder Output.* (Aero Digest, Vol. 42, No. 6, June, 1943, p. 355.)
672	13009	U.S.A. ...	*Ford Production of Turbo Superchargers.* (Aero Digest, Vol. 42, No. 6, June, 1943, p. 447.)
673	13030	U.S.A. ...	*Mass Production of Sperry Instruments.* (Aero Digest, Vol. 42, No. 4, April, 1943, pp. 247-252.)
674	13053	G.B.	*Undercuts for Threads.* (Aircraft Production, Vol. 5, No. 54, April, 1943, p. 176.)
675	13073	U.S.A. ...	*Studebaker Produces 63 Gears and Assemblies for the Wright Cyclone Engine.* (J. Geschelin, Automotive Industries, Vol. 88, No. 12, 15/6/43, pp. 32-35, 67-70.)
676	13125	G.B.	*Shaving Aircraft Engine Gears.* (A. W. Harris, Machinery, Vol. 63, No. 1,608, 5/8/43, pp. 153-157.)
			General Methods and Equipment.
677	12523	U.S.A. ...	*Easier Operation on Slanting Drill Table.* (Commercial Aviation, Vol. 5, No. 4, April, 1943, p. 104.)
678	12534	G.B.	*Radio Unit Generating High Frequency Energy for Firing Explosive Rivets.* (Aircraft Prod., Vol. 5, No. 57, July, 1943, p. 329.)
679	12800	U.S.A. ...	*Experiences in the Use of Electrostatic Fly Ash Precipitators.* (I. G. McChesney, Trans. A.S.M.E., Vol. 65, No. 3, April, 1943, pp. 143-148.)
680	12822	U.S.A. ...	*Water Treatment at the Calco Chemical Division.* (V. L. King and others, Industrial Eng. Chemistry (News Edition), Vol. 21, No. 13, 10/7/43, pp. 1046-1049.)
681	12879	G.B.	*Shop Loading (Effect on Production Costs, etc.).* (D. Tiranti, Aircraft Engineering, Vol. 15, No. 174, Aug., 1943, pp. 239-241.)
682	12937	G.B.	*Chain Welding by Semi-Automatic and Automatic Methods,* (Machinery, Vol. 62, No. 1,600, 10/6/43, pp. 626-629.)
683	12985	U.S.A. ...	*Republics Power-Driven Rotary Indexing Table on Vertical Miller for Continuous Milling of Rod Ends.* (Aero Digest, Vol. 42, No. 6, June, 1943, p. 196.)
684	13001	U.S.A. ...	*Efficient Wire Twisting Speeded by New Apparatus* (Aero Digest, Vol. 42, No. 6, June, 1943, p. 349.)
685	13002	U.S.A. ...	*Cushioned Bar Speeds Buckling-up Process (Avoids Denting of Aluminium Stock).* (Aero Digest, Vol. 42, No. 6, June, 1943, pp. 349-351.)
686	13003	U.S.A. ...	*Universal Fixture Simplifies Tube and Wire Bending.* (Aero Digest, Vol. 42, No. 6, June, 1943, p. 353.)
687	13004	U.S.A. ...	*Quick Method for Testing Spot Welds.* (Aero Digest, Vol. 42, No. 6, June, 1943, pp. 353-355.)
688	13054	U.S.A. ...	*American Practice in Machining, Moulding and Installation of Plexiglas.* (Aircraft Production, Vol. 5, No. 54, April, 1943, pp. 183-189.)

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689	13058	G.B.	*Moulding and Machining to Obtain Simpler Tooling and Speedier Production.* (Aircraft Production, Vol. 5, No. 54, April, 1943, p. 196.)
690	13059	G.B.	*Electro Magnetic Equipment for Crack Detection in Welded Steel Tubular Structures.* (Aircraft Production, Vol. 5, No. 54, April, 1943, pp. 201-202.)
691	13128	G.B.	*Loading of Work Sections.* (A. G. McAdam, Machinery, Vol. 62, No. 1,602, 24/6/43, pp. 678-679.)
			Plants (Layout, etc.).
692	12555	U.S.A. ...	*Interior Photo of Douglas Aircraft Windowless Plant.* (American Aviation, Vol. 6, No. 22, 15/4/43, p. 60.)
693	12842	U.S.A. ...	*Chevrolet's New Forge Plant.* (J. Geschelin, Automotive Industries, Vol. 89, No. 2, 15/7/43, pp. 20-23, 94.)
694	12947	G.B.	*Light Alloys in Industrial Plant and Equipment.* (Light Metals, Vol. 6, No. 63, April, 1943, pp. 196-202.)
695	13013	U.S.A. ...	*Willow Run Ford Bomber Plant.* (F. M. Reck, Aero Digest, Vol. 42, No. 4, April, 1943, pp. 112-115, 243-244, 256.)
696	13018	U.S.A. ...	*Curtiss-Wright's Indiana Propeller Plant.* (Aero Digest, Vol. 42, No. 4, April, 1943, pp. 181, 188-192, 198, 276.)
			New Machines and Tools.
697	12512	U.S.A. ...	*A New Jig for the Determination of Compression Yield Strength in Aircraft Design.* (Mech. Eng., Vol. 65, No. 5, May, 1943, p. 364.)
698	12600	U.S.A. ...	*Small Tools for High Production.* (A. A. Schwartz, A.S.M.E. Preprints, 346, 1943.)
699	12681	Germany ...	*Portable Universal Radial Drilling Machine for the Assembly Shop.* (From Werkstatt und Betrieb, Vol. 75, No. 9, Sept., 1942, pp. 221.) (Engineers' Digest, Vol. 4, No. 3, March, 1943, pp. 80-81.)
700	12984	U.S.A. ...	*Fully Automatic Spar Riveter Used at Curtiss-Wright Plants.* (Aero Digest, Vol. 42, No. 6, June, 1943, pp. 195, 332-333.)
701	13044	U.S.A. ...	*Plastic Punches for Drop Hammer and Hydraulic Press Tools.* (Aircraft Production, Vol. 5, No. 54, April, 1943, pp. 166-169.)
702	13063	Canada ...	*Modern Jigs Used in Lancaster and Mosquito Canadian Manufacture.* (W. J. Jakimiuk, Canadian Aviation, Vol. 16, No. 6, June, 1943, pp. 105-111.)
			Salvage.
703	12884	G.B.	*Salvage of Porous Castings.* (Engineers' Digest, Vol. 4, No. 4, April, 1943, p. 129.)
704	12927	G.B.	*Salvage of Porous Castings.* (Machinery, Vol. 62, No. 1,599, 3/6/43, p. 604.)

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705	13024	U.S.A.	... *General Motors Standardizes Tool Salvage Methods.* (Aero Digest, Vol. 42, No. 4, April, 1943, pp. 215-216, 270.)

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706	12532	G.B. ...	... *Accident Proneness in Industry, Minimising Casualties.* (Aircraft Prod., Vol. 5, No. 57, July, 1943, pp. 328-329.)
707	12546	U.S.A.	... *Women Who Work for Victory.* (W. G. Tuttle, Preprints of Papers at the A.S.M.E., June 14-16, 1943.)
708	12599	U.S.A.	... *Women in War Industry.* (W. A. Simonds, A.S.M.E. Preprints, 331, 1943.)
709	12682	Germany	... *Portable Electrical Ventilator for the Workshop.* (From Werkstatt und Betrieb., Vol. 75, No. 9, Sept., 1942, pp. 219-220.) (H. Rötscher, Engineers' Digest, Vol. 4, No. 3, March, 1943, pp. 81-82.)
710	12949	G.B. ...	... *Hygiene of the Light Metal Industries. Precautions to be Taken in the Handling of Chemicals Employed in the Processing of Aluminium and Magnesium (Fluoride Poisoning).* (Light Metals, Vol. 6, No. 62, March, 1943, pp. 111-113.)
711	13048	U.S.A.	... *Metal Safety Goggles.* (Aircraft Production, Vol. 5, No. 54, April, 1943, p. 171.)
712	13123	G.B. ...	... *Mercury Vapour Lighting in Factory.* (Machinery, Vol. 63, No. 1,608, 5/8/43, p. 147.)
713	13144	G.B. ...	... *Hours of Work and Their Influence on Health and Efficiency.* (H. M. Vernon, Bulletin of War Medicine, Vol. 3, No. 12, Aug., 1943, pp. 691-692.)

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Tanks and Military Vehicles.

714	12560	U.S.A.	... *Suspension Design for Tanks.* (J. M. Colby, S.A.E. Journal, Vol. 51, No. 7, July, 1943, p. 64.)
715	12565	U.S.A.	... *Lessons Learned from World War II about Designing for Accessibility (Maintenance of Army Vehicle Engines, etc.).* (E. S. van Deusen, S.A.E. Journal, Vol. 51, No. 7, July, 1943, pp. 36-38, 53-55.)
716	12566	U.S.A.	... *Dust Problems in Military Vehicle Operations.* (L. F. Overholt, S.A.E. Journal, Vol. 51, No. 7, July, 1943, pp. 66-67.)
717	12567	U.S.A.	... *Engines for Tanks.* (R. J. Icks, S.A.E. Journal, Vol. 51, No. 7, July, 1943, pp. 39-41, 56-57.)
718	12845	U.S.A.	... *Dust, a Potent Enemy of Military Vehicles.* (Automotive Industries, Vol. 89, No. 2, 15/7/43, p. 30.)
719	13079	Germany	... *New German Mark VI Tank (Photograph).* (Automotive Industries, Vol. 88, No. 12, 15/6/43, p. 48.)
720	13260	U.S.A.	... *Army's Amphibious Truck.* (Automotive Industries, Vol. 89, No. 1, 1/7/43, p. 21.)

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721	13714	G.B. ...	... *The Daimler "Scout" Armed Reconnaissance Car.* (Automobile Engineer, Vol. 33, No. 437, June, 1943, pp. 219-227.)

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722	12506	U.S.A.	... *Future Possibilities of Diesel Road Locomotives.* (P. B. Jackson, Mech. Eng., Vol. 65, No. 5, May, 1943, pp. 335-338, 359.)
723	12507	U.S.A.	... *Diesel Locomotive Progress Under War Conditions.* (Mech. Eng., Vol. 65, No. 5, May, 1943, pp. 339-342.)
724	12545	U.S.A.	... *Influence of Post-War Materials and Machinery on Railway Freight Equipment.* (M. P. Taylor, Preprints of Papers at the A.S.M.E., June 14-16, 1943.)

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Wireless.

Aircraft Radio Equipment.

725	12625	U.S.A.	... *First Details on Development of Radar (Radio Detecting and Ranging).* (American Aviation, Vol. 6, No. 24, 15/5/43, p. 19.)
726	12748	U.S.A.	... *Bendix Automatic Radio S.O.S. Device.* (American Aviation, Vol. 7, No. 2, 15/6/43, p. 62.)
727	12818	U.S.A.	... *Tuning Indicators and Circuits for Frequency Modulation Receivers.* (J. A. Rodgers, Procs. of I.R.E., Vol. 31, No. 3, March, 1943, pp. 89-93.)
728	12977	U.S.A.	... *Allied and Enemy Aircraft Radio Equipment.* (J. I. Waddington, Aero Digest, Vol. 42, No. 6, June, 1943, pp. 154-155, 333.)
729	13010	U.S.A.	... *Portable Hand Powered Radio Transmitter for Rescue Work.* (Aero Digest, Vol. 42, No. 6, June, 1943, pp. 447-449.)
730	13736	U.S.A.	... *Automatic Radio Transmitter for Crews Downed at Sea.* (Air Tech., Vol. 3, No. 1, 15/7/43, p. 8.)
731	13737	U.S.A.	... *Radio Navigation Aids.* (P. C. Sandretto, Air Tech., Vol. 3, No. 1, 15/7/43, pp. 16-18, 58.)

Antennas.

732	12409	G.B. ...	... *Aerial Characteristics and Coupling Systems (Data Sheet).* (Electronic Engineering, Vol. 15, No. 186, August, 1943, pp. 109-112.)
733	12860	U.S.A.	... *Loop Antennas for Aircraft.* (G. F. Levy, Proc. of the I.R.E., Vol. 31, No. 2, Feb., 1943, pp. 56/66.)
734	12861	U.S.A.	... *A Note on the Characteristics of the Two Antenna Aircraft.* (C. W. Harrison, Proc. of the I.R.E., Vol. 31, No. 2, Feb., 1943, pp. 75-78.)

Testing and Research.

735	12410	G.B. ...	... *Television After the War.* (Electronic Engineering, Vol. 15, No. 186, August, 1943, pp. 118-120.)
736	12426	G.B. ...	... *Radio Research on Metre Waves.* (Nature, Vol. 152, No. 3,846, 17/7/43, pp. 83-84.)

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737	12614	U.S.A. ...	*Altitude Test Inspection of Radio Apparatus in Bomber Nose Rest Chamber.* (American Aviation, Vol. 7, No. 1, 1/6/43, p. 62.)
738	12642	G.B.	*Radio Research and Production.* (G. M. Garro-Jones, Engineering, Vol. 156, No. 4,048, 13/8/43, p. 135.)
739	13130	G.B.	*Low Temperature Stratosphere Chamber for Testing Aircraft Parts and Radio Equipment.* (Machinery, Vol. 62, No. 1,602, 24/6/43, p. 681.)
			General Electricity.
740	12362	G.B.	*Insulating Cables with Polyvinyl Chloride.* (Plastics, Vol. 7, No. 75, August, 1943, pp. 328-332.)
741	12364	Germany ...	*Protection of Overhead Cable Equipment.* (E.T.Z., Vol. 60, p. 1009.) (Perlick, Plastics, Vol. 7, No. 75, August, 1943, p. 334.)
742	12488	U.S.A. ...	*Testing Electrical Contacts.* (Mechanical World, Vol. 114, No. 2,950, 16/7/43, pp. 79-80.)
743	12689	Germany ...	*Leakage Currents, Their Cause and Properties.* (From Elektrontechnische Zeitschrift, Vol. 63, No. 19-20, May 21, 1942, pp. 237-241.) (R. Vieweg and H. Klingelhöffer, Engineers' Digest, Vol. 4, No. 3, March, 1943, pp. 90-91.)
744	12705	U.S.A. ...	*Electric Cable Insulation from Synthetic Rubber.* (Modern Plastics, Vol. 20, No. 7, March, 1943, p. 110.)
745	13109	Switzerland ...	*A New High Precision Method for Short Circuit Measurements on Transformers.* (Brown-Boveri Review, Vol. 29, No. 5, May, 1942, pp. 126-129.) (P. Waldvogel, Engineers' Digest, Vol. 4, No. 5, May, 1943, pp. 156-157.)
			Electronics.
746	12407	G.B.	*Physics and the Static Characteristics of Hard Vacuum Valves.* (J. H. Fremlin, Electronic Engineering, Vol. 15, No. 186, August, 1943, pp. 103-107.)
747	12406	G.B.	*Dust Cored Coils (Powder Filling).* (V. G. Welsby, Electronic Engineering, Vol. 15, No. 186, August, 1943, pp. 96-98.)
			SOUND, LIGHT AND HEAT.
			Sound Propagation.
748	13410	G.B.	*The Propagation of Sound in the Atmosphere.* (E. S. Richardson, Endeavour, Vol. 1, No. 3, July, 1942, pp. 118-121.)
			Radiant Heat, Refrigeration, etc.
749	12505	U.S.A. ...	*How Air Conditioning Has Advanced Refrigeration.* (W. H. Carrier, Mech. Eng., Vol. 65, No. 5, May, 1943, pp. 332-334.)
750	12513	U.S.A. ...	*Specific Heats of Gases.* (Mech. Eng., Vol. 65, No. 5, May, 1943, p. 365.)
751	12712	G.B.	*Radiant Heat—The Application of Gas-Generated Infra-Red Rays.* (Automobile Engineer, Vol. 33, No. 439, Aug., 1943, pp. 326-329.)

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752	13098	U.S.A. ...	*Measurement of Ultra-Violet Solar Radiation in Washington*, 1936-1942. (W. W. Coblentz and R. Stair, J. of Research, National Bureau of Standards, Vol. 30, No. 6, June, 1943, pp. 435-447.)
753	13366	G.B. ...	... *Thermal Conductivity Units.* (J. Jennings, Engineering, Vol. 156, No. 4,049, 20/8/43, pp. 154-155.)

Fluorescent Lighting, Photo-Electric Radiometry, etc.

754	12893	U.S.A. ...	*Fluorescent Lamps in the U.S.A.* (H. Hausner, Engineers' Digest, Vol. 4, No. 4, April, 1943, pp. 118-119.)
755	12967	G.B. ...	... *Inspection of Sodium Light.* (Light Metals, Vol. 6, No. 60, Jan., 1943, p. 32.)
756	13083	G.B. ...	... *Combined Discharge Fluorescent Lighting.* (Mechanical World, Vol. 114, No. 2,952, 30/7/43, pp. 120-121.)
757	13099	U.S.A.	... *A Tungsten-in-Quartz Lamp and its Applications in Photo-Electric Radiometry.* (R. Stair and W. O. Smith, J. of Research, National Bureau of Standards, Vol. 30, No. 6, June, 1943, pp. 449-459.)
758	13148	G.B. ...	... *Fluorescence of Organic Molecules.* (J. Weiss, Nature, Vol. 152, No. 3,850, 14/8/43, pp. 176-178.)

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759	12792	U.S.A.	... *Navy's New Combat Camera.* (W. Stull, Flying and Industrial Aviation, Vol. 32, No. 4, April, 1943, p. 98.)
760	12819	U.S.A.	... *The Focussing View Finder Problem in Television Cameras.* (G. L. Beers, Procs. of I.R.E., Vol. 31, No. 3, March, 1943, pp. 100-106.)
761	13055	G.B. ...	... *Photography and Production.* (A. Batley and F. W. Coppin, Aircraft Production, Vol. 5, No. 54, April, 1943, pp. 190-194.)
762	13081	G.B. ...	... *Photography as an Aid to Office Management.* (P. H. Billington, Mechanical World, Vol. 114, No. 2,952, 30/7/43, pp. 113-116.)
763	13249	G.B. ...	... *Air Photography.* (J. L. Vachell, Aeroplane, Vol. 65, No. 1,682, 20/8/43, pp. 214-215.)
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METEOROLOGY

(ASTRO-NAVIGATION, LIGHTNING, VAPOUR TRAILS, ETC.).

765	12389	Germany	... *Vapour Trails.* (Flugsport, Vol. 35, No. 11, 14/7/43, pp. 151-152.)
766	12408	G.B. ...	... *The Effect of Lightning on Receiving Aerials.* (J. F. Shipley, Electronic Engineering, Vol. 15, No. 186, August, 1943, p. 107.)
767	12833	G.B. ...	... *Astronomical Navigation Without Mathematics.* (A. L. Mieville, J. of the Royal Aeron. Soc., Vol. 47, No. 392, Aug., 1942, pp. 273-283.)

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768	12862	U.S.A. ...	*Lightning Striking Frequencies for Various Heights.* (Proc. of the I.R.E., Vol. 31, No. 2, Feb., 1943, p. 79.)
769	12974	U.S.A. ...	*Great Circle Tracking (Celestial Navigation).* (T. Collins, Aero Digest, Vol. 42, No. 6, June, 1943, pp. 122-124, 139, 319, 336-338.)
770	13014	U.S.A. ...	*McMillen's Spherographical System of Celestial Navigation.* (D. Brouwer and F. W. Keator, Aero Digest, Vol. 42, No. 4, April, 1943, pp. 116-118, 139-140, 266-268.)

PHYSIOLOGY AND AVIATION MEDICINE.

771	11871	Germany ...	*Intestinal Movement in Anoxia.* (Abstract, Luftfahrtmedizin, Vol. 7, No. 1, 1942, pp. 98-117.) (G. A. Weltz and R. v. Werz, Bulletin of War Medicine, Vol. 3, No. 10, June, 1943, p. 585.)
772	11872	Switzerland ...	*Studies on Respiration and Sickness at High Altitudes and on Respiratory Regulation.* (K. Lenggenhager, Bulletin of War Medicine, Vol 3, No. 10, June, 1943, p. 585.)
773	11873	U.S.A. ...	*The Rôle of the Adrenal Cortex in Anoxia: The Effect of the Repeated Daily Exposures to Reduced Oxygen Pressure.* (G. W. Thorn and others, Bulletin of War Medicine, Vol. 3, No. 9, May, 1943, p. 525.)
774	11874	Germany ...	*Structional Changes in Generalized Anoxia.* (Luftfahrtmedizin, Vol. 6, No. 4, pp. 281-295, July 30, 1942.) (F. Büchner, Bulletin of War Medicine, Vol. 3, No. 9, May, 1943, p. 526.)
775	11875	Germany ...	*Acidosis of Cardiac Muscle During Oxygen Lack.* (Luftfahrtmedizin, Vol. 6, No. 4, July 30, 1942, pp. 296-302.) (K. Gollwitzer-Meier, Bulletin of War Medicine, Vol. 3, No. 9, May, 1943, p. 526.)
776	11876	Germany ...	*Electrical Phenomena Accompanying Anoxia of the Peripheral Nervous System.* (Luftfahrtmedizin, Vol. 6, No. 4, July 30, 1942, pp. 314-322.) (H. Schaefer, Bulletin of War Medicine, Vol. 3, No. 9, May, 1943, p. 526.)
777	11877	Germany ...	*Intercranial Circulation in Anoxia Collapse.* (Luftfahrtmedizin, Vol. 6, No. 4, July 30, 1942, pp. 323-326.) (M. Schneider, Bulletin of War Medicine, Vol. 3, No. 9, May, 1943, p. 527.)
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781	11881	Canada	...	*Some Observations on Ear, Nose and Throat Disabilities Associated with Aviation.* (R. S. Pentecost, Bulletin of War Medicine, Vol. 3, No. 9, May, 1943, pp. 528-529.)
782	11885	G.B. ...	...	*Preventive Medicine in Relation to Aviation.* (Proc. Roy. Soc. Med., 1939, Vol. 32, pp. 455-472.) (H. E. Whittingham, Bulletin of War Medicine, Vol. 1, No. 3, Jan., 1941, pp. 190-192.)
783	11886	G.B. ...	...	*The Emotional Factor in Service Aviation.* (J. Roy. Nav. Med. Serv., 1939, April, Vol. 25, No. 2, pp. 108-119.) (B. C. Archer, Bulletin of War Medicine, Vol. 1, No. 3, Jan., 1941, pp. 192-193.)
784	11887	G.B. ...	...	*The Place of the Electrocardiograph in the Examination for Flying. A Discussion of the Electrocardiograph in the Flying Examination, its Possibilities and Limitations.* (J. Aviation Med., 1939, March, Vol. 10, No. 1, pp. 31-43.) (Bulletin of War Medicine, Vol. 1, No. 3, Jan., 1941, pp. 193-194.)
785	11888	G.B. ...	...	*Air Sickness.* (T. S. Rippon, Practitioner, 1940, April, Vol. 144, pp. 411-420.) (Bulletin of War Medicine, Vol. 1, No. 3, Jan., 1941, p. 194.)
786	11889	G.B. ...	...	*The Toxicity of Carbon Monoxide at High Altitudes.* (J. Aviation Med., 1939, Dec., Vol. 10, No. 4, pp. 211-215.) (J. W. Heim, Bulletin of War Medicine, Vol. 1, No. 3, Jan., 1941, p. 194.)
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788	11892	G.B. ...	...	*Effect of Centrifugal Force in Flying.* (Proc. Staff Meeting, Mayo Clinic, 1939, Sept. 27, Vol. 14, pp. 612-618.) (R. B. Phillips and C. Sheard, Bulletin of War Medicine, Vol. 1, No. 3, Jan., 1941, pp. 196-197.)
789	11893	G.B. ...	...	*Aviation Deafness, Acute and Chronic.* (Arch. Otolaryngology, 1940, Sept., Vol. 32, No. 3, pp. 417-428.) (P. A. Campbell and J. Hargreaves, Bulletin of War Medicine, Vol. 1, No. 3, Jan., 1941, p. 197.)
790	11895	U.S.A.	...	*The Rôle of Aviation Medicine in the Development of Aviation.* (Internat. Cong. Military Med. and Pharm., Washington, D.C., 1939, Vol. 2, pp. 81-95.) (A. D. Tuttle and H. G. Armstrong, Bulletin of War Medicine, Vol. 1, No. 4, March, 1941, pp. 259-260.)
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793	11899	G.B.	...	*Pilot Fitness. A Safety Factor in Aviation.* (Brit. J. Ophthalm., 1940, Dec., Vol. 24, No. 12, pp. 581-597.) (C. E. Ferree and G. Rand, Bulletin of War Medicine, Vol. 1, No. 4, March, 1941, pp. 264-265.)
794	11900	Germany	...	*Altitude Sickness.* (Deut. Med. Woch., 1940, May 3, Vol. 66, No. 18, pp. 485-488.) (A. Rühl, Bulletin of War Medicine, Vol. 1, No. 4, March, 1941, pp. 264-265.)
795	11903	G.B.	...	*The Effect of Anoxia in High Altitude Flights on the Electrocardiogram.* (J. Aviation Med., 1940, Dec., Vol. 11, No. 4, pp. 166-178.) (M. S. White, Bulletin of War Medicine, Vol. 1, No. 6, July, 1942, p. 409.)
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801	13120	U.S.A.	...	*Effect of Altitude on Pilots' Teeth (Metal Fillings).* (American Aviation, Vol. 7, No. 4, 15/7/43, p. 18.)
802	13140	U.S.A.	...	*Physiology of Flying. Hazards and Remedies.* (D. B. Dill, Bulletin of War Medicine, Vol. 3, No. 12, Aug., 1943, p. 690.)
803	13141	U.S.A.	...	*Some Problems in Aviation Medicine.* (A. Graybiel, Bulletin of War Medicine, Vol. 3, No. 12, Aug., 1943, pp. 690-691.)
804	13142	G.B.	...	*Further Investigation of Night Vision Among Personnel of an A.A. Unit.* (B. St. J. Steadman, Bulletin of War Medicine, Vol. 3, No. 12, Aug., 1943, p. 691.)
805	13143	G.B.	...	*Incidence of Pulmonary Tuberculosis of Adult Type in the R.A.F. Results of Mass Radiography of 75,000 Cases.* (A. G. Evans, Bulletin of War Medicine, Vol. 3, No. 12, Aug., 1943, pp. 671-672.)
806	13145	G.B.	...	*Night Visual Capacity of Psychological Cases.* (P. C. Livingston and B. Bolton, Bulletin of War Medicine, Vol. 3, No. 12, Aug., pp. 682-683.)
807	13146	G.B.	...	*Medical Manual of Chemical Warfare.* (Bulletin of War Medicine, Vol. 3, No. 12, Aug., 1943, p. 683.)

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808	13150	G.B. ...	... *Physiology of Glow Vision*. (A. S. Holbourn, Nature, Vol. 152, No. 3,850, 14/8/43, pp. 190-191.)

MATHEMATICS AND PHYSICS.

809	12476	U.S.A.	... *Interpolation by Means of a Cubic Curve (with Application to Hardness Determination)*. (L. H. Fry, A.S.T.M., No. 122, May, 1943, pp. 29-30.)
810	12859	G.B. ...	... *A Simple Method of Constructing Stability Diagrams*. (W. S. Brown, R. and M., No. 1,905, 10/10/42, pp. 1-5.)
811	12983	U.S.A.	... *Simplification of Dynamic Stability Computations (Pt. II)*. (M. M. Munk, Aero Digest, Vol. 42, No. 6, June, 1943, pp. 183-185, 327.)
812	12987	U.S.A.	... *Lofting Problems of Streamline Bodies (Pt. 14)*. (C. M. Hartley and R. A. Liming, Aero Digest, Vol. 42, No. 6, June, 1943, pp. 205-209, 321.)
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814	13039	G.B. ...	... *The Operational Calculus*. (H. T. H. Piaggio, Nature, Vol. 152, No. 3,847, 24/7/43, p. 63.)
815	13172	U.S.A.	... *Euler's Number (Study of Cavitation)*. (Mechanical Engg., Vol. 65, No. 8, Aug., 1943, p. 597.)

December, 1943

Abstracts from the Scientific and Technical Press

(No. 117. October, 1943)

AND

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(*Prepared by R.T.P.3.*)

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Notices and abstracts from the Scientific and Technical Press are prepared primarily for the information of Scientific and Technical Staffs. Particular attention is paid to the work carried out in foreign countries, on the assumption that the more accessible British work (for example that published by the Aeronautical Research Committee) is already known to these Staffs.

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Note.—As far as possible, the country of origin quoted in the items refers to the original source.

The Effect of Nitrogen on the Properties of Certain Austenitic Valve Steels. (H. Cornelius and K. Fahsel, L.F.F., Vol. 20, No. 7, 20/7/43, pp. 210-216.) (117/1 Germany.)

The valve steels commonly employed contain about 15 per cent. Cr, 13 per cent. Ni and 2 per cent. W (Tungsten). Recently austenitic Cr-Mn steels of much smaller Ni content have been proposed as a satisfactory alternative and it was claimed that the heat stability of such steels could be still further improved by small additions of N_2.

To investigate this matter, the authors prepared 14 samples of austenitic steels covering the following ranges of per cent. composition:—

C	Si	Mn	Ni	Cr	W	Ti	N_2
.43	1.7	1.1	3.1	11.7	0	0	.02
.50	3.5	6.7	9.1	18.3	1.2	.48	.23

The variation in N_2 content was obtained by adding different amounts of Ferrochrome (containing up to 6 per cent. N_2) to the melt (high frequency furnace). The specimens were hardened by air cooling after forging (1,050°C.) and subsequently tempered at 800°C. for 3 hours and again air cooled.

The tests were carried out both in this (so-called original) state and after a further annealing at 700°C. for 200 hours followed by air cooling.

A comparison of the mechanical properties obtained in the original and annealed state enabled conclusions as to the stability of the austenitic structure to be drawn.

The preliminary tests covered the elastic limit (.2 per cent. set), yield point (.2 per cent.), ultimate tensile, extension at fracture, contraction and impact strength, as well as magnetic saturation.

The authors conclude that the stabilising effect of N_2 on the austenitic structure of the steels is very small and that its introduction into the steel does not render possible any marked reduction in the Ni content as had been previously claimed. Under the most favourable circumstances the max. possible addition of N_2 (~ .25 per cent.) is equivalent to about 2 per cent. Ni, but in most cases considerably less (.5 per cent.). (Some previous investigators had claimed the replacement value of .2 per cent. N_2 to be the equivalent of 6 per cent. Ni.)

In addition to the mechanical tests detailed above, the resistance of the steels to both rapid and slow rates of deformation was investigated. For the former, a special pendulum apparatus devised by the author was utilised, the experiments covering the temperature range up to 850°C. For the slow rates of deformation, the D.V.L. creep test was carried out at 700°C.

For high rates of deformation (pendulum test) the addition of N_2 is definitely beneficial at temperatures up to 400°C. At the working temperature of the valve (850°C.), however, the N_2 appears to have no effect. From the creep tests at 700°C., the authors conclude that the N_2 produces only a very small effect.

Further tests carried out on scale formation, thermal conductivity and thermal expansion all showed that the N_2 content exerts only a very minor influence.

In conclusion, the specimens were nitrided in an atmosphere of NH_3 and tests carried out on the surface hardness and thickness of nitrided layer. It appeared again that the N_2 content of the alloy affected the results only slightly.

The final conclusion appears to be that the addition of N_2 to austenitic steels of the type discussed seems scarcely justified.

Such austenitic steels, especially when containing about .5 per cent. Ti, are sufficiently stable to replace the commonly employed valve steels of high nickel and tungsten contents, thus leading to a considerable saving in these two constituents.

The Effect of Welding Faults on the Static and Dynamic Strength of Welded Joints of Steel St. 52, with Notes on the Limits of Fault Detection by X-Ray Examination. (H. Keller and E. Klein, Schiff u. Werft, Vol. 44-24, No. 17-18, Sept., 1943, pp. 257-261.) (117/2 Germany.)

The experiments refer to welded steel plates of St. 52 material such as used in ship building.

(Abstractor's Note.—This steel has the following average compositions:—

C = .2%	Cu = .55%
Mn = 1.2%	P = .05%
Si = .5%	S = .05%

Ultimate tensile of commercial product 52-64 kg./mm.^{2}.)

Thickness of plate 15-22 mm., standard butt weld, V seam. A selenium electrode was employed, type Bohler K.V.A. The test specimen (35 to 45 mm. wide) were obtained either from the hull itself (making use of such portions as had to be removed in order to provide room for certain fittings) or from samples of work supplied by the welder during his periodic examination for efficiency.

In addition, special samples incorporating intentional faults were prepared by the authors.

In general, welding faults may be of the following types :—

1. Slag inclusion, mainly due to electrode sheathing.
2. Pores, due to gas absorption (vapourisation of sheathing).
3. Cracks, due to shrinkage or local hardening.
4. Local burning, due to excessive welding current.
5. Adhesion and root faults, due to the current being too low or the electrode moving too rapidly.

Slag and gas inclusions generally give rise to spherical cavities and if finely dispersed affect the strength of the weld only slightly (no notch effect). In the case of trained welders using modern equipment and suitable electrodes, the chance of producing large inclusions and thus weakening the weld, is practically negligible, and for this reason the authors rule out this source of trouble in the present investigation. On the other hand, faults 3 and 5 (crack and root faults) give rise to considerable notch effects and are considered by the authors as responsible for most of the subsequent failures, especially under fatigue.

Since the samples obtained from the hull or submitted by the welder were generally of high quality and especially free from cracks, the authors prepared additional test pieces in which these faults were exaggerated intentionally. Thus root or adhesion faults were induced by a quick pass of the electrode whilst artificial cracks were prepared by first forming a connection by means of welded-on straps. These were subsequently broken and the plates rewelded with a continuous seam in such a way that the fractured strap surfaces were retained as internal cracks. The position of these cracks was found by X-ray examination and the plate subsequently cut into strips of equal width each incorporating one crack.

The extent of root (adhesion) or crack faults was estimated by projecting the area of such faults (as revealed after test) on a plane at right angles to the axis of the specimen and dividing by the nominal cross-section of test specimen.

Tensile Tests.

About 35 samples were tested, of which 229 (originating mainly from the ship's hull or from the specimen submitted by the welder) showed neither root faults nor internal cracks of the weld when examined after ultimate failure. These so-called " faultless " specimens had an average tensile strength of 54 kg./mm.^{2} (50 per cent. of samples) which is only very little less than average values for the original plate. The scattering of this " faultless " specimen was however relatively large, ranging from 45 to 61 kg./mm.^{2}, whilst the ultimate for steel St. 52 falls between the limits 52-64 kg./mm.^{2}. It is evident that even in the absence of visible root and crack faults, other factors such as the notch effect of the burn or local hardening in the transition zone influence the results. In this connection it should be pointed out that all the welds were tested " as finished " so as to reproduce practical conditions. No attempts were made to improve the weld subsequently, either by milling off the bead or burned zone or by annealing the joint. There is no doubt that such measures would have improved the consistency of the results appreciably.

Effect of Root Faults on Ultimate Tensile.

After eliminating the " faultless " specimen, those showing adhesion or root faults after failure (45 specimens) were collected and their ultimate tensile plotted on a relative " fault size " basis, the latter being estimated from the projected area of the fault as already explained. The " fault sizes " examined varied from 1-15 per cent. of the nominal cross-section and over this range the mean ultimate tensile falls off linearly with increase in fault to about 42 kg./mm.^{2} at

15 per cent. The scatter limits however overlap those of the " faultless " specimen, with the result that fault sizes up to 3 per cent. never produce a weakening below the lower limit of the faultless specimen.

In some cases, even fault sizes of 15 per cent. show an optimum tensile strength within the " faultless " limits.

It is thus obvious that root and adhesion faults must exceed 15 per cent. if their effects are not to be masked by other factors such as the notch effect associated with burning and changes in hardness of the metal surrounding the weld.

EFFECT OF CRACKS ON ULTIMATE TENSILE.

As already stated, the normal work samples were remarkably free from cracks and special specimens incorporating intentional cracks had to be prepared to cover a " fault " range up to 15 per cent. (Total number of specimens=75.) The mean tensile strength diminishes linearly with increase in fault size as before, dropping to 45 kg./mm.^{2} at 15 per cent. The scatter range again overlaps that of the faultless specimen with the result that optimum tensile values with 15 per cent. cracks fall within the range of strength values.

FATIGUE TESTS.

The tests were carried out under pulsating tensile load (zero to maximum) on specimen 45 mm. wide and 400 mm. long.

ROOT AND ADHESION FAULTS.

Eighty-four specimens were tested of which 34 were classed as " faultless," 34 showed faults ranging from 0 to 10 per cent., 8 from 10-20 per cent. and 8 above 20 per cent. (projected area of fault/area of cross-section).

FAULTLESS SPECIMEN.

The average fatigue strength (10^7 load cycles) was of the order of 15 kg./mm.^{2}, *i.e.*, only 28 per cent. of the mean ultimate tensile of the corresponding specimens. For the unwelded plate, the fatigue strength is of the order of 55-60 per cent. of the ultimate tensile which shows again that although the specimen weld was free from obvious root faults and cracks, and conformed otherwise to standard appearance, nevertheless the other factors already mentioned had introduced the equivalence of notch effects and seriously reduced the resistance under varying load.

The variability of these factors is reflected in the scattering of the fatigue strength which varied between 12 and 17 kg./mm.^{2} for the apparently " faultless " specimen.

FAULT GRADING 1-10 PER CENT.

The fatigue strength of all the 34 specimens of this grading fall within the scatter of the faultless specimen so that root faults of this magnitude are again hidden by other factors.

FAULT GRADING 10-20 PER CENT.

The fatigue strength of these 8 specimens fall within the limits 9 and 14 kg./mm.^{2} and thus show a marked deterioration.

FAULT GRADING > 20 PER CENT.

None of the specimens reached a life of 10^7 cycles. A 35 per cent. fault averaged 5×10^6 cycles at 8 kg./mm.^{2}.

From the above it appears that root faults only exert a predominant influence if they exceed 10 per cent. in value.

CRACKS.

Altogether 60 specimens were tested, of which 24 had faults up to 10 per cent., 29 between 10 and 20 per cent. and 7 between 20 and 30 per cent. Whilst the faultless specimen had a fatigue strength lying between 12 and 17 kg./mm.², faults up to 10 per cent. gave values between 12 and 16 kg./mm.², *i.e.*, to all intents and purposes identical results. Faults between 10 and 20 per cent. had a fatigue strength lying between 8 and 14 kg./mm.². A few specimens with larger faults ($\sim$ 30 per cent.) had an average lift of 5×10^6 cycles at 10 kg./mm.².

The fatigue strength of welds with crack faults is thus very similar to that obtained with adhesion faults of comparable size.

Summing up, it appears that fault sizes have to exceed 10 per cent. before their effect on the tensile and dynamic strength becomes sufficiently large not to be hidden by other factors. The problem naturally arises of determining the possible fault size by non-destructive methods. For this purpose 81 of the static and 125 of the dynamic specimens were X-rayed before the tests and the photographs compared with the visual examination of the weld after destruction.

The results proved most disappointing. In many cases the photographs showed no trace of any fault, although the latter exceeded 15 per cent. About 50 per cent. of the faults appeared only as slight abnormalities on the photographs without any clue as to their length. The length of the fault was reproduced correctly in about 25 per cent. of the cases examined. In no case could a correct estimation of the fault area be made from the photograph.

The mechanical tests have shown that such faults must exceed 10 per cent. before their effects overshadow notch effects due to burning and hardening of the metal surrounding the weld seam. Since root faults and cracks exceeding 10-15 per cent. in projected area are in any case very unlikely to occur in practice, the authors question the utility of the present method of X-ray inspection of ship welding. Till something better has been devised, an ample margin of safety will be assured by working to the lower limit of the test results given in this paper, since on the actual hull any faults in the seam will have the support of the sound sections. In this respect the test specimen worked under much more strenuous conditions.

In conclusion, reference is made to ultra-sonic inspection methods for welds. In theory, such methods should give information on the size of the fault and are thus more promising. They have, however, not yet reached the state of development necessary for application in ship building.

Experiments on the Effects of Transverse Holes, Splines and Diameter Changes on the Torsional Fatigue Strength of Shafts. (W. Herold, Z.V.D.I., Vol. 81, No. 18, 1/5/37, pp. 505-509.) (117/3 Germany.)

The available experiments on fatigue strength lead to the conclusions that fracture occurs whenever the stress at any point exceeds a definite value which is a characteristic of the material.

If σ_n = nominal stress calculated by elementary theory, without allowing for stress concentration factors.

σ_{max} = actual stress peak,

then $\sigma_{max} = \beta_k \sigma_n$,

where β_k = notch effect of material (under fatigue) and is always > 1.

β_k depends on material and geometrical form of section and probably also to some extent on the size of the specimen.

Under static load, a similar relationship between nominal and maximum stress is found to hold, *i.e.*,

$$\sigma_{max} = \alpha_k \sigma_n$$

where α_k = shape coefficient which is generally assumed to depend on the geometrical form of the sections only and can be determined in certain simple

cases theoretically. α_k can also be measured experimentally with the help of special small base extensometers or obtained from photoelastic investigations. Finally, the hydraulic or electric tank analogy method can be used. The extensometer measurements are not in very good agreement with the other methods (in this connection see Abstract 117/4) and there is some doubt as to whether d_k does not also depend in practice, to some extent, on the size of the specimen. Further experiments on this point are urgently wanted. β_k (fatigue) is always less than α_k (static) the stress peaks evidently tending to equalise themselves under alternating load (plastic flow).

In addition to α_k and β_k the factor

$$\eta_k = (\beta_k - 1)/(\alpha_k - 1)$$

is of interest. This is called the notch sensitivity, and indicates what fraction of the static stress increase due to the notch is effective in raising the stress under fatigue. It is reasonable to suppose that η_k will depend mainly on the material and could thus be used to estimate β_k provided α_k for the section were known. Published information on this point being rather scanty, the author has carried out torsional fatigue tests on plain and stepped steel shafts of which the tensile strength ranged from over 120 to about 40 kg./mm.^{2}. The maximum diameter D of the shafts was 20 mm. throughout, the ratio d/D thus varying from 1 to .5 (d = diameter of stepped portion). The fillet radius ρ varied from 0 (infinitely sharp) to 3 mm., thus covering a ρ/d range from 0 to .24.

(For the infinitely sharp step the transition radius is less than .1 mm.)

Comparison of the fatigue strength of the plain and stepped shafts gave β_k and using published data for α_k, η_k could be calculated for the different sections, on the assumption that α_k depends only on the shape and not on material.

The results show that η_k is practically constant for a given steel and does not depend on the shape of the section (*i.e.*, sharpness of fillet) over the limits investigated. The values obtained ranged from about .4 to .2, depending on the quality of the steel, the higher values generally corresponding to the stronger materials (ultimate tensile $\sim$ 100 kg./mm.^{2}).

It is interesting to note that whilst α_k varies from 1.35 to 5 (the latter figure corresponding to inf. sharp fillet), β_k only varies from 1.08 to 2.5. η_k, on the other hand, is a material constant, the values repeating to within ± 5 per cent. irrespective of shape of fillet.

It should be emphasised that these results primarily apply to samples of the size tested and the possibility of a scale effect on η_k is left open to further investigation.

Following these tests, the author carried out similar investigations on splined shafts. Both 4 and 10 splined sections were tested, the splines covering either the full length of the specimen or limited to roughly one half, the remainder of the shaft being stepped down. The transition radius from the plane to splined section was 10 mm. in all the specimens. In the case of the 10 splines the keyways were well rounded at the base, the side flanks having a small groove in the corner to provide clearance for the grinding wheel. This type of spline was common in motor car rear axles till fairly recently. As was to be expected, the notch effect of such a section is very high, due to the groove effect at the corner of the flank ($\beta_k = 1.92$, *i.e.*, maximum nominal stress of material at base of spline = fatigue strength of solid shaft 1.92). For the 10 splines with well rounded bases, on the other hand, $\beta_k = 1.09$. In both cases external diameter of shaft = 15 mm. diameter at bottom of spline = 11.8 mm. (4 splines), 11 mm. (10 splines), the splines going the full length of the specimen. The advantages of the 10 splines are therefore obvious.

If, as is usual, the splines are cut out of the solid shaft, the stress increase at the bottom of the keyway leads to a wastage of material, since the strength of the solid unsplined section of larger diameter cannot be fully utilised. If,

however, the shaft is stepped down beyond the spline, the stresses in the outside fibres of this section can be made to approach those actually existing in the keyway. This equalisation of stress during power transmission should react favourably on β_k. In order to investigate this further the author carried out fatigue tests with stepped shafts which were only splined on one diameter. The results show that in the case of the 10 splined shaft previously investigated, the stresses became roughly equalised when the diameter of the step approximated to that of the bottom of the keyway. In this case the notch effect practically disappears ($\beta_k < 1.04$). In the case of the more highly stressed 4 spline design, the plain stepped shaft has to be about 10 per cent. smaller than the diameter of the spline base to ensure equal stressing of the two parts. In this case, however, although material is saved β_k is not appreciably affected, this emphasising the deleterious effect of the grinding wheel groove in the corner of the spline.

In conclusion, the author carried out tests on the effect of a transverse hole on β_k and η_k for cylindrical specimen of the same general dimensions as tested previously. The experiments covered five grades of steel, the hole being 3 mm. diameter and the diameter of the specimen 15 mm. The transverse hole is flared out at 45° at each end for a depth of .3 mm. β_k ranged from 1.72 to 2.25, the higher values generally corresponding to the stronger steels (tensile range 43 to 120 kg./mm.^{2}).

Assuming $\alpha_k = 3.4$ from published work, η_k is fairly constant for the range of materials investigated (average value .36).

The fact that the notch sensitivity β_k for transverse holes is so close to the corresponding value for fillets on the same class of steels (average $\beta_k = .30$) seems to indicate that this factor is indeed independent of the geometrical form of the section and reflects a characteristic of the material.

Determination of the Stress Concentration (Shape) Factor of Fillets on Stepped Shafts Under Torsion (Extensometer Measurements). (A. Weigand, L.F.F., Vol. 20, No. 7, 20/7/43, pp. 217-219.) (117/4 Germany.)

The experiments were carried out on stepped shafts with a d/D ratio varying between .5 and .9 and sharpness of fillet ρ/d ranging from .1 to .25 (ρ = radius of fillet, d = diameter of step, D = diameter of shaft).

The shafts were subjected to pure torsion and the principal strains ϵ_1 and ϵ_2 were measured at a number of points along the surface of the step and including the fillet. For this purpose a special photo-electric extensometer with a base length of 1.3 mm. was employed (see Abstract 117/5), and by taking the average of three readings at points situated at 90° along the circumference of any one section, instrumental errors as well as the effect of a slight residual bending moment could be eliminated. (In pure torsion, ϵ_1 and ϵ_2 should be equal but of opposite sign.)

In the case of two-dimensional stress we have:—

$$\sigma_1 = E/(1-\mu^2)\,(\epsilon_1 + \mu\epsilon_2)$$
$$\sigma_2 = E/(1-\mu^2)\,(\epsilon_2 + \mu\epsilon_1),$$

where $\sigma_1, {}_2$ = principal stresses corresponding to ϵ_1 and ϵ_2.
μ = Poissons ratio $= \frac{1}{2}(E/G) - 1$ $(= 1/m)$.
G = modulus of rigidity.

The shear stress τ is then given by

$$\tau = \tfrac{1}{2}(\sigma_1 - \sigma_2) = \{\, E/(1+\mu) \,\}\ \{\, \tfrac{1}{2}(\epsilon_1 - \epsilon_2)\tfrac{1}{2} \,\}$$

For the material utilised

$$E = 2.14 \times 10^6$$
$$G = .82 \times 10^6$$
and $\mu = .305$

Therefore

$$\tau = .823\ (\epsilon_1 - \epsilon_2) \times 10^6$$

Putting

τ_o = constant shear stress in stepped shaft at some distance from fillet,

τ_{max} = max. shear stress in fillet,

the shape coefficient $\alpha_k = \tau_{max}/\tau_o$.

The following table gives the results obtained:—

ρ/d	d/D	α_k (measured)	α_k (calculated)
.25	.5	1.22	1.23
	.67	1.19	1.20
	.82	1.13	—
	.90	1.09	—
.214	.50	1.25	1.27
	.70	1.20	1.22
	.82	1.19	—
	.90	1.10	—
.15	.50	1.36	1.37
	.70	1.28	1.30
	.80	1.23	—
	.90	1.15	—
.11	.50	1.45	1.49
	.60	1.41	1.44
	.70	1.35	1.38
	.80	1.30	1.32
	.90	1.22	—

The calculated values were obtained from the approximate equation of Sonntag:

$$\alpha_k = \beta\ (1.5 + 3\alpha)\ \{\ (1 + 4\alpha)/(1 + 6\alpha)\ \}\ + (1 - \beta - 2\alpha\beta)\ (1 + 1/12\alpha)$$

where $\alpha = \rho/d$ (sharpness of fillet)

$$\beta = d/D$$

This equation only holds provided $\beta \leqq 1/(1 + 2\alpha)$.

It will be noted that over this range the agreement between theory and experiment is satisfactory.

NOTE.—For a determination of α_k under bending for crankshaft fillets (web-gudgeon pin), see R.T.P. Translation No. 1,831. For these experiments a Junkers optical extensometer with a base length of 1.5 mm. was employed. For a standard Junkers engine crankshaft, α_k at this fillet is of the order of 2.8 (bending).

A Photo-Electric Extensometer with Very Small Working Base. (E. Lehr and H. Granacher, Forschung, Vol. 7, No. 2, April, 1936, pp. 66-74.) (117/5 Germany.)

In order to investigate the stress distribution on the surface of a loaded element, it is essential that the strain measurements be carried out over a very small base length (1-2 mm.) in order to ensure that peak values due to irregularities in the stress shall be properly recorded (fillets, notches, etc.). This necessarily entails very high orders of magnification if stresses of the order of .1 kg./mm.^{2} have to be estimated from the corresponding strains. Thus, in the case of steel subjected to single axis stress, a change in stress of 1 kg./mm.^{2} alters a 2 mm.

base by about 10^{-4} mm. A magnification of the order of 10 to 50,000 is thus required in order to obtain a reasonable size scale deflection of the extensometer.

In the extensometer devised by the author, a magnification of this order is obtained mainly by photo-electric means, the direct mechanical magnification being only of the order of 50.

The instrument depends on the variation in the amount of light transmitted through a narrow slot with change in width of the latter, the slot being mechanically linked to the mobile base point of the extensometer. The change in light transmitted is measured photo-electrically on a microammeter, the sensitivity of the photocell being such that a change in slot width of 1/200 mm. and subjected to compression loads up to 3,000 kg. (max. contraction $\sim$ 1.4 mm.), gives a scale deflection of about 3 mm. With the mechanical linkage of 50/1 between slot and base, this corresponds to an overall effective magnification of 30,000 which can easily be doubled by substituting a more sensitive galvanometer for the microammeter.

The instrument naturally depends on the source of illumination maintaining constant intensity over reasonable periods and this is ensured by very accurate current control. The instrument is calibrated on a tensile test machine against a standard Huggenberger 10 mm. base extensometer and it is stated that calibrations taken at the beginning and end of a test series (some of which lasted 3-4 days) did not differ by more than 1-2 per cent.

In order to investigate the possibilities of the new extensometer, a very complete investigation on the stress distribution over the surface of a heavy conical disc spring was carried out. This spring had a plate thickness of 10.42 mm. and an external diameter of 229 mm., with a central hole of 90 mm. diameter (spring constant 40,150 kg./cm.).

Two identical springs of this type were placed in series in a testing machine

Starting at the inner edge, extensometer measurements of the radial and circumferential strain (ϵ_r and ϵ_u), were carried out at 19 stations covering the distance between the inner and outer edges of the disc (7 cm.).

From these strain measurements the corresponding stresses were calculated from well known relations (two dimensional stress):—

$$\sigma_u = E/(1-\mu^2)\ (\epsilon_u + \mu\epsilon_r)$$
$$\sigma_r = E/(1-\mu^2)\ (\epsilon_r + \mu\epsilon_u)$$

where μ = Poisson's ratio = .3. The equivalent resultant stress was also calculated at each station from the formula

$$\sigma_{res} = \sqrt{(\sigma_u^2 + \sigma_r^2 - \sigma_u \cdot \sigma_r)}.$$

The results are given in tabular form for a net axial load of 3,000 kg., readings taken with a Huggenberger extensometer being also inserted for comparison. The results obtained with the two types of extensometer are in reasonable agreement at distances between 7 and 10 mm. from the inner edge. As was to be expected, the Huggenberger instrument, with its longer base, underestimates the circumferential stress peak at the inner edge by about 600 kg./mm.^{2} (4,300 against 4,900 kg./mm.^{2} with photoelectric) a similar difference between the two instruments exists at the outer edge of the spring, the shorter base instrument again giving the higher reading (397 against 271 kg./mm.^{2}).

The author has also calculated the principal radial and circumferential stresses, using the flat plate approximation.

It appears that both the spring constant and the maximum stress at the inner edge (central hole) can be predicted with sufficient accuracy by this theory (resultant stress = 4,715 kg./mm. calculated against 4,960 observed and spring constant = 43,700 kg./cm. calculated against 40,150 kg./cm. observed).

The calculated stress does not, however, diminish as rapidly with increasing distance from central hole as is indicated by the experimental values.

Thus, at the outer edge, the theoretical resultant stress is still 1,500 kg./mm.^{2} whilst the experimental value is only 400.

Evidently the flat plate theory breaks down under these conditions. It is proposed to repeat the calculations making use of the theory of conical shells, when better agreement is to be expected.

An Electrical Fuel Reserve Meter for Aircraft. (R. Czerlinski and J. Zeyno, L.F.F., Vol. 20, Nos. 8-9, 16/10/43, pp. 263-267.) (117/6 Germany.)

The instrument estimates the fuel content of the tank by direct weight and for this purpose the tank is suspended by a system of electrically recording spring balances, based on the change in resistance principle. In order to compensate acceleration effects, the readings of the balances are not taken directly but are compared with those of a second balance loaded with a constant weight of a few grams and undergoing a deflection of the same order as the main balance under static conditions. If both balances are placed in close proximity, the ratio of their readings is independent of acceleration and inclination.

The main balances are designed by the authors to conform in their outer shape to the suspension bolts of the aircraft fuel tank. The exchange can therefore be carried out on standard designs without difficulty. The gauges consist essentially of stiff tubular springs having an extension of about .05 mm. for 100 kg. load. This change in dimension is transmitted to a constantan wire (.06 mm. thick) which is fixed to the tube in such a way that an increase in tank weight causes a reduction in the tension of the wire, the accompanying resistance change being recorded electrically. The preliminary tension in the resistance wire can thus be adjusted near to the elastic limit of the wire without danger of the wire breaking due to overload and the sensitivity of the recorder is a maximum. With an initial resistance of 36 ohm, the change of resistance is of the order of 60×10^{-3} ohm for a load change of 100 kg. (.05 mm. deflection). The initial tension is rendered independent of temperature change (difference in expansion of tubular spring and wire) by incorporating an invar steel compensating link. The effect of temperature change on the resistance of the wire itself is allowed for by placing a second similar wire (unstretched) inside the tubular spring (oil filled) and having the two wires in opposite arms of a Wheatstone bridge.

The inertia compensating balances are of very simple construction, the constantan wire being loaded directly with a 30 gm. weight. The effect of temperature on the resistance is allowed for as before by a second unstretched wire in the opposite arm of a bridge. Normally, the tank is suspended by means of six balances, three a side, the recording and compensating wires being suitably joined to form a single bridge circuit.

A similar circuit is formed by the two inertia compensating balances, the two bridges being finally linked so that the out-of-balance current corresponding to the ratio of the loads can be measured on a moving coil instrument. For this purpose each bridge was connected to a special Siemens bolometer relay giving an amplification between 2 and 4 mA. per mV. These relays have straight line characteristics up to 15 mA. and are stated to be independent of changes in the supply voltage of both bridge and relay circuits. The power consumption of the fuel weight meter is of the order of 15 Watts and thus can be easily supplied by the aircraft battery.

Laboratory and subsequent flight tests have shown that the recorder functions satisfactorily for inclination of the aircraft up to 50° and inertia effects up to 3 g.

Due to the small thermal lag in the bolometer amplifier, effects due to vibration of the aircraft are largely damped out and the fuel content of the tank estimated correctly to within ± 3 per cent.

Triptane—a New Fuel of High Octane rating. (Chemical and Engineering News, Vol. 21, No. 18, September 25, 1943, pp. 1560 and 1562.) (117/7 U.S.A.)

Triptane or 2, 2, 3-trimethylbutane has been known as a laboratory curiosity for a considerable time. Its production involved the use of zinc dimethyl (Grignard reaction) and the small yields obtainable rendered the product very expensive ($40 a gallon). On account of its exceedingly high knock rating (ON ~ 150), possible commercial methods of manufacture have been studied and it is now claimed that a catalytic process has been evolved which utilises certain gaseous by-products of cracking and reforming plants and which will cut down the cost of triptane to about $1 a gallon.

The pilot plant has been in operation for 300 hours with no indication of decline of catalyst activity.

The process, in addition to triptane, yields two other valuable hydrocarbons: 2, 3 dimethylbutane and 2, 3 dimethylpentane, which are superior to alkylates as blending agents for aviation petrol.

The density of triptane is .69 and its melting point −25°C. The use of the pure material as an aviation fuel would thus require special anti-freeze precautions. It is stated, however, that a blend of 85 per cent. triptane and 15 per cent. petrol has a freezing point of −78°C.

The following table gives some of the physical constants of these new fuels:—

Compound.	Boiling Points.	Melting.	Density.
2, 3 dimethylbutane	... 58°C.	−128°C.	.66
Triptane (2, 2, 3-trimethylbutane)	... 81°C.	−25°C.	.69
2, 3 dimethylpentane	... 89.7°C.		.69

The Corrosion Resistance of Cladded Al-Zn-Mg Alloys. (W. Bungardt, L.F.F., Vol. 20, No. 7, 20/7/43, pp. 207-209.) (117/7 Germany.)

The corrosion resistance of Al-Zn-Mg alloys containing little or no copper (so-called Hydronalium) is higher than that of Al-Cu-Mg alloys of the Dural class, whilst their original strength is of the same order (~ 45 kg./mm.^{2}). Dural cladded with Al is, however, superior to the Hydronalium over long exposure periods, provided the material has been age-hardened at room temperature. Hot age-hardening, on the other hand, largely destroys the benefits of the cladding (copper diffusion from the parent Dural sheet into Al covering).

The question naturally arises whether the corrosion resistance of the Hydronalium alloys could also be further improved by cladding. Tests have shown that cladding with aluminium produces no beneficial results in this case. If, however, a second Al-Zn-Mg alloy is used, a corrosion resistance equivalent to that of Al cladded Dural can be obtained in all cases, with the additional advantage that the cladded material can be used either in the cold or hot age-hardened condition without affecting the corrosion resistance.

The sheet for cladding purposes has the following per cent. composition:—

Zn	Mg	Mn	Fe	Si	Al
2.68	.62	.18	.01	.07	rest

The composition of the parent sheet is given below, the two alloys only differing in copper content. The composition of Dural is given for comparison.

Alloy	Zn	Mg	Cu	Mn	Fe	Si	V	Cr	Al
1	4.35	1.52	1.55	.15	.12	.08	.12	—	rest
2	4.35	3.51	.27	.30	.08	.09	—	.25	,,
Dural	—	.99	3.42	1.00	.50	.44	—	—	,,

The corrosion tests covered a period of 200 days and were carried out by the D.V.L. standard methods (stirring and intermittent immersion both for plain and looped specimen—the letter for stress corrosion effect).

The specimen sheets were 1 mm. thick with a cladding of .05 mm.

The original mechanical properties of the cladded materials are given below.

Alloy	Condition	Yield Point Kg./mm.²	Ultimate Kg. mm.²	Extension (10) %
1	*a*	27.0	42.3	21.1
	b	33.2	40.7	13.2
2	*a*	30.0	48.1	20.6
	b	42.5	48.6	11.0
Dural	*a*	26.6	43.7	19.7
	b	31.0	43.3	14.6

(*a*) Cold aged (room temperature).
(*b*) Hot aged (120° for 24 hours for alloys 1 and 2).
,, (160° for 72 hours for Dural).
Cladding for (1) and (2)—special alloy already discussed.
Cladding for Dural—99.5 per cent. Al.

It will be noted that alloy 2, condition *b*, is especially attractive for its high yield point.

The Weibel Process of Electric Welding in Aircraft Construction (Indirect Resistance Method). (F. Helbring, Luftwissen, Vol. 10, No. 7, July, 1943, pp. 198-201.) (117/9 Germany.)

The Weibel process makes use of special copper sheeted carbon electrodes which are carried in a V shaped water-cooled clamp held by the operator and slowly passed over the flange requiring welding, the metal acting as a bridge between the electrodes.

The process is specially suited for light alloy sheets .2 to 2 mm. thick, and excellent welds can be obtained in all materials amenable to gas (fusion) welding or the arc atom process (pure Al, Dural, Electron, Al-Si-Mg, etc.).

The distinctive features of the process are the electrode holder and the special shape of tip utilised.

The power consumption is very small, 50-250 amps at 3.5 to 8 volts, and can be obtained through a small transformer fed by the 220 or 380 3-phase A.C. supply.

The electrode holder is water-cooled and easily manipulated by hand. The two copper sheeted carbons (220 mm. long and 10 to 30 mm. diameter) are gripped at about 60 mm. from the tip so that their axes are inclined at 20°. Special attention is paid to the shape of the tip which is in the form of a double wedge, the inner flat surfaces forming an angle of about 15° with the direction of motion of the holder, whilst the outer sides are at about 30° to the sheet undergoing welding. The separation of the electrodes is effected by hand pressure (return spring incorporated in handle). The sheets to be welded are first flanged at 90°, the height of the flange depending on the thickness of the sheet. Great care has to be taken on the accurate fit of the parts, the success of the operation depending largely on this factor. After a preliminary cleaning (mechanical or chemical), a suitable flux (*e.g.*, Autogal, Firinit, etc.) is applied to the upper surface only and the electrodes separated to grip the flange. Due to the wedge shaped tip, contact is limited to a very small area leading to a rapid melting of the flange at this point. The passage of the electrode at a suitable speed by hand completes the seam, which can be up to 1,000 mm. long before the electrode requires cleaning. Control of the weld is much facilitated by imparting a slight vibratory (up and down) motion to the electrodes. This is effected by incorporating an out-of-balance mass into the electrode holder, this mass being operated by the cooling water. The vibration of the electrodes results into the seam assuming a fish scale appearance (length of steps about 3 mm.) instead of being uniform, and this is stated to be a special advantage when welding very thin sheet (.2 mm.). The special tapering of the electrodes employed in the Weibel process confines

the softening effect of the heat supply to a narrow zone (about 20 mm. width) and this, together with the ease of operation, constitutes one of the main advantages of the process. Experience has shown that the Weibel process yields very consistent values for the tensile strength of the weld, and that the values are generally higher than those obtained by gas fusion for the same material. Even if the seam is not subsequently machined, the strength of the weld is generally within 10 per cent. of that of the parent material. At the same time the welds are stated to be highly resistant to corrosion. As already stated, the Weibel process is specially attractive for thin sheet metal work (flange welding) and various examples are illustrated. In a subsequent article, the fabrication of but-welds by the same process will be described, as well as an automatic welding machine, incorporating the Weibel process.

New Miniature Electric Arc Welding Appliances. (Luftwissen, Vol. 10, No. 7, July, 1943, p. 202.) (117/10 Germany.)

The miniature welding appliances brought out by Siemens and Halske are intended to replace soldering previously employed in instrument manufacture. This not only leads to a considerable economy in tin, but the work is speeded up since the rather complicated cleaning of the joint, which is essential in soldering, is now much simplified. Thus, when connecting up wire spools by welding, the insulating lacquer on the wire need not now be removed.

The welding unit is supplied in three sizes, the smallest being specially intended for the welding of wires ranging from .02 to .5 in diameter. The largest size will handle cross sections up to 10 mm.^{2}. In each case the transformer is plugged into the ordinary A.C. supply (220 or 110 volt).

The welding tool is no larger than the corresponding soldering iron, and carries a carbon electrode, the second electrode being formed by the work piece which is held in a special clamp.

The attachment of the carbon electrode in the holder is very ingenious.

For the welding of very small wires the electrode is attached to the end of a reed which vibrates in step with the A.C. supply through the agency of an electro-magnet.

The reed is carried inside a steel tube provided with a lateral hole towards which the electrode vibrates, and which faces the joint to be welded. A condenser in circuit with the magnet ensures that the arc is struck at the instant at which the P.D. between carbon electrode and work piece has reached the high value necessary for welding.

For slightly heavier work an alternative tool with a central carbon electrode attached to an iron plunger is used. In this case the tubular container finishes off with a ceramic guide and perforated welding head.

The arc is struck at will by an electro-magnet which surrounds the plunger.

In both types the carbon electrodes are easily replaceable.

In principle, all the heavy metals can be welded, the easiest welds being of copper with copper, bronze, silver and nickel.

For Al. welds a special carbon electrode is provided.

Electrolytic deposits do not affect weldability provided such deposits do not melt.

Thus tin or zinc deposits on iron or steel are unsuitable. Brass is best welded when in its natural state, although galvanic deposits do not offer pronounced difficulties.

Non-conducting deposits on Al. (such as anodic or phosphate layers) must be removed prior to welding.

A Photo-Electric Torsiograph. (W. Spillmann, Schweizer Archiv., Vol. 8, No. 8, August, 1942, pp. 252-255.) (117/11 Switzerland.)

The torsiograph operates on the stroboscope principle, the relative displacement of two flywheels being measured by the amount of light transmitted through suitably spaced slots. For this purpose, the two flywheels are in the form of hollow drums, which rotate one inside the other. The drums are closed at one end and their supporting shafts are in line, but face in opposite direction. The inner drum is very light and provided with a belt drive to the shaft under investigation, or can be driven directly from the end of this shaft. The second drum is heavy and acts as a reference inertia mass. It is driven from the first drum by means of a radial spring member, the relative motion being limited to $\pm 5°$ by means of a stop. Both drums are fitted with 12 slots inclined at 45° to the axis, the external drum slots being illuminated by a close fitting ring carrying 11 miniature electric light bulbs. The light entering the inner drum is caught by a mirror (paraboloid of revolution) attached to the solid end of the drum and reflected on to a stationary photo-cell (cæsium gas-filled) supported inside the hub of the inertia drum. The time lag of this cell is so short that it can be neglected.

The photoelectric current is observed by means of a cathode ray oscillograph, a polar diagram being preferable on account of the simple relationship between r.p.m. and harmonic order. The basic circle for this diagram is obtained by generating a sine vibration of shaft frequency which is then split up into two components at 90° phase difference and which are passed to the first control grid of a special amplifier and then suitably applied to the two pairs of deflection plates of the oscillograph. The photo-cell controls through a second valve grid the anode current in step with the torsional vibrations.

The amplifier has a linear scale over the frequency range 1 to 10,000 cycles/sec. Calibration is effected in a simple manner by oscillating the torsiograph by hand through a known angle.

The natural frequency of the inertia mass of the instrument is of the order of 3.8 sec., and the amplitude of low frequency vibrations (~ 20/sec.) are recorded correctly to within 3 per cent. For higher frequencies the error is negligible.

The natural frequency of the belt drive can also be made sufficiently high to have no effect on the measurements.

A direct friction drive can also be utilised, the torsiograph pulley being provided with an outer covering of thin rubber for this purpose.

Direct comparison of the readings of the new photo-electric torsiograph with other known types (mechanical Geiger or electrical capacity type) on a special test bench has shown that the readings are consistent and trustworthy. Its employment on Diesel and aircraft engines has similarly demonstrated its robustness. It might be objected that the finite number of slots and lamps necessarily introduce a light flicker even in the absence of slot width changes (*i.e.*, no torsional vibration). This so-called optical frequency is given by

$$f_{opt} = n/60 \{ 1/(1/z_1 + 1/z_2) \}$$

where n = r.p.m.
z_1 = number of point sources of light.
z_2 = number of slots.

With $z_1 = 11$.
$z_2 = 12$.

f_{opt} is of the 132nd order, which should be negligible in the case of small amplitudes.

It must, however, not be forgotten that the above calculation applies to point sources or narrow slots.

By frosting the bulbs in a special manner and interposing a thin cylinder of ground glass between the lights and the external series of slots, the light flicker at constant slot width can be completely eliminated.

Spot Welding of Aluminium Alloys in Aircraft Construction. (A. V. Zeerleder, Inter. Avia., No. 879-880, 9/8/43, pp. 1-7.) (117/12 Switzerland.)

The welding of heat hardened Al. alloys in aircraft construction is attractive from the point of view of production if the dangers due to softening of the material at the seam and change in structure of the sheet in the neighbourhood of the weld could be overcome.

Spot welding appears to offer special advantages in this connection since the heat is localised and only applied for a short period ($\sim$ 1/10 sec.).

The subsequent cooling is very rapid (heat conduction to the surrounding material) and the small size of the annular softened region should not produce a serious drop in strength.

Test figures show that this is indeed the case and that provided the welding machine is controlled properly, spot welds of high and consistent strength can be obtained.

According to the author, the following average shearing strength in kg. per spot should be obtainable under these conditions.

Thickness of sheet (m/m.)	Metal			
	Pure Al (hard).	Avienal (Al-Cu-Mg) age hardened.	Anticorodal (Al-Mg.Si) age hardened.	Peraluman (Al-Mg) (soft).
·5	50	100	100	100
1	100	190	150	200
2	220	320	380	480
3	250	430	480	—

The scatter of the test result depends on the sheet thickness, and in the case of Avional (Dural) amount to about $\pm$20 per cent. for .5 mm. and $\pm$15 per cent. for 3 mm. sheet. If for the same material we assume the specific strength of the 1 mm. present sheet as 100 per cent., the strength of the welding point decreases from 105 per cent. (.5 mm. sheet) to 70 per cent. for the 3 mm. sheet. The specific strength of the weld thus decreases with increase of sheet gauge.

As regards the spacing of the spots, similar considerations to those holding for riveting apply. The closer the spacing, the greater the proportion of current lost by shunt action of its neighbouring spot. For 1 mm. gauge, a 20 mm. spacing is recommended.

For sheet gauges up to 1.5 mm. and in the absence of excessive fatigue loads, spot welding may replace the much more expensive riveting in aircraft construction besides speeding up production considerably.

This, however, only applies if the process can be accurately controlled under practical conditions. Lack of such control in the past has caused the strength of individual spot welds in light alloy to vary in the ratio of 5 to 1 in practice (as distinct from laboratory results) leading to a rejection of the process in this important field, whilst the spot welding of iron sheet has already been adopted extensively.

The main difficulty with light alloys is the close approach of necessary welding temperature to the melting point of the alloy combined with the great heat conductivity of the material. (In the case of steel the melting point exceeds the welding temperature by 400°C.) The spot welding of light alloys thus necessitates the passage of very heavy currents for very short periods. Whilst 1 mm. sheet iron can be satisfactorily spot welded with a maximum current of 10,000 amps.,

the light alloy requires 18,000 amps. for the same thickness, increasing to 28,000 amps. for 2.5 mm. gauge.

According to the author, complicated welding programmes in which the current is both variable and intermittent (electronic control) are not justified by practical results. All that is required is the maintenance of a constant current amplitude over a definite number of cycles (both factors depending on nature and thickness of material).

Since the heat generated depends on the contact resistance, great care must be taken to remove any oxide layer on the sheets. The author recommends strongly that the welding machine be fitted with some form of current indicator, so that variation of the current from optimum values be immediately detected and the machine blocked. Besides time (*i.e.*, number of cycles) and current, the contact pressure between the electrodes (water-cooled copper) and the sheet requires careful control. Excessive pressure dimples the metal whilst insufficient pressure causes arcing and highly undesirable alloying of the copper electrodes with the sheet.

For 1 mm. sheet, the author recommends a contact pressure of 250 kg. using 5 mm. electrodes. This pressure is usually applied hydraulically and maintained constant during the welding period. A more complicated pressure programme, advocated in some quarters, in which a preliminary pressure of 600 kg. is applied prior to the passage of the current and followed by an equally high pressure after the completion of the weld (which is carried out at 300 kg.) yields no better results according to the author.

Providing the welding machine is of sufficient output and the current, time and pressure controlled to the limits required, the author feels confident that consistent results can be obtained for sheet metal gauges between .5 and 1.5 mm.

The article concludes with a useful bibliography (18 items).

LIST OF SELECTED TRANSLATIONS.

No. 63.

NOTE.—Applications for the loan of copies of translations mentioned below should be addressed to the Secretary (R.T.P.3), Ministry of Aircraft Production, and not to the Royal Aeronautical Society. Copies will be loaned as far as availability of stocks permits. Suggestions concerning new translations will be considered in relation to general interest and facilities available.

Lists of selected translations have appeared in this publication since September, 1938.

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1936	Helmbold, H. B. ... Keune, J.	*Contribution to the Profile Theory, Part III.* (L.F.F., Vol. 20, No. 5, 16/6/43, pp. 152-170.)
1937	Krahn, E.	*Calculation of the Second Janzen-Rayleigh Approximation of the Compressible Flow Past a Profile.* (L.F.F., Vol. 20, No. 5, 16/6/43, pp. 147-151.)
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1939	Zuerl	*Horten All-Wing Gliders.* (Der Flieger, Vol. 22, No. 4, April, 1943, pp. 108-109.)
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Requests for further information or translations should be addressed to R.T.P.3, Ministry of Aircraft Production.

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Tactics and General Strategy.

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2	13247	G.B.	*The Work of the Royal Observer Corps.* (C. G. Grey, Aeroplane, Vol. 65, No. 1,682, 20/8/43, pp. 209-211.)
3	13285	G.B.	*Balance Sheet of Area Bombing.* (P. G. Masefield, Aeroplane, Vol. 65, No. 1,681, 13/8/43, pp. 183-187.)
4	13294	U.S.A. ...	*Invasion Communications. The Work of Signal Corps.* (R. L. Sigerson, Scientific American, Vol. 169, No. 2, Aug., 1943, pp. 53-55.)

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5	13310	G.B.	*R.A.F. Mark Target Areas with "Rings" of Green Flares (German Report).* (Flight, Vol. 44, No. 1,809, 26/8/43, p. 220.)
6	13313	G.B.	*R.A.F. Set Up Air Cover from Landing Grounds on Sicily (Photographs).* (Flight, Vol. 44, No. 1,809, 26/8/43, pp. 226-227.)
7	13318	U.S.A. ...	*Theories of Air Power—An American Analysis.* (F. A. de V. Robertson, Flight, Vol. 44, No. 1,809, 26/8/43, pp. 234-235.)
8	13319	G.B.	*Tonnage of Bombs Dropped on Germany (Air Ministry Figures).* (Flight, Vol. 44, No. 1,809, 26/8/43, p. 236.)
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10	13341	Italy	*Italy's Air Power.* (V. L. Gruberg, Flight, Vol. 44, No. 1,808, 19/8/43, pp. 193-196.)
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14	13569	U.S.A. ...	*Fundamentals of Air Fighting.* (Flying and Industrial Aviation, Vol. 32, No. 6, June, 1943, pp. 24-27.)
15	13593	U.S.A. ...	*Natal Aircraft Base.* (Flying and Industrial Aviation, Vol. 32, No. 6, June, 1943, pp. 86, 167.)
16	13623	G.B.	*The Rôle of Naval Aircraft in the Capture of Madagascar.* (B. J. Hurren, Aeronautics, Vol. 8, No. 6, July, 1943, pp. 31-33.)
17	13861	Germany ...	*German White Paper on Allied Raids.* (Aeroplane, Vol. 65, No. 1,679, 30/7/43, p. 133.)
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22	13290	U.S.A. ...	*The Sould-Ratkin Pre-Flight Trainer (Simulates Actual Flying Conditions).* (A. Klemin, Scientific American, Vol. 169, No. 2, Aug., 1943, p. 88.)
23	13525	G.B.	*The Rolls-Royce Aero Instruction School.* (Aeroplane, Vol. 65, No. 1,677, 16/7/43, pp. 70-71.)
24	13528	G.B.	*Study and Training in the W.A.A.F.* (Aeroplane, Vol. 65, No. 1,677, 16/7/43, p. 79.)

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28	13630	France ...	*Fighting French Air Lines.* (Aeronautics, Vol. 8, No. 6, July, 1943, p. 49.)
29	13768	G.B.	*Training of Telegraphist Air Gunner.* (J. Russell, Aeronautics, Vol. 8, No. 5, June, 1943, pp. 54-55.)
30	13799	G.B.	*School for Air Gunners.* (Flight, Vol. 44, No. 1,802, 8/7/43, pp. 46-48.)
31	13810	G.B.	*De Havilland Technical Training.* (Flight, Vol. 43, No. 1,801, 1/7/43, p. 13.)
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46	13211	U.S.A.	... *Protecting Flyers Against Cold.* (D. O'Herty, Flying and Industrial Aviation, Vol. 32, No. 1, Jan., 1943, pp. 51, 108-112.)
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73	13526	G.B.	*The de Havilland Mosquito II (Recognition Details).* (Aeroplane, Vol. 65, No. 1,677, 16/7/43, p. 73.)
74	13529	G.B.	*Spitfires for Air-Sea Power Work.* (Aeroplane, Vol. 65, No. 1,677, 16/7/43, pp. 80-81.)
75	13580	G.B.	*Handley Page "Halifax II" (Recognition Details).* (Flying and Industrial Aviation, Vol. 32, No. 6, June, 1943, p. 63.)
76	13615	G.B.	*The Hurricane IID "Tank Buster."* (Trade and Engineering Times, Vol. 53, No. 951, May, 1943, p. 34.)
77	13631	G.B., U.S.A.	*The Hawker Typhoon and the Republic Thunderbolt.* (Aeronautics, Vol. 8, No. 6, July, 1943, pp. 50-53.)
78	13770	G.B.	*The Fairey Albacore and the Seafire (Photograph).* (Aeronautics, Vol. 8, No. 5, June, 1943, p. 55.)
79	13792	G.B.	*Typhoon Bomber.* (Flight, Vol. 44, No. 1,802, 8/7/43, pp. 33-35.)
80	13795	G.B.	*Hawker Henley (Recognition Details).* (Flight, Vol. 44, No. 1,802, 8/7/43, p. 38.)
81	13796	G.B.	*Miles Martinet (Recognition Details).* (Flight, Vol. 44, No. 1,802, 8/7/43, p. 39.)
82	13856	G.B.	*Bristol Blenheim IV (Photographs).* (Aeroplane, Vol. 65, No. 1,679, 30/7/43, pp. 128-129.)
83	13943	G.B.	*The Blenheim Family.* (Aeroplane Spotter, Vol. 4, No. 91, 26/8/43, pp. 196-197.)
84	14082	G.B.	*Defiant II Target Tug (Recognition Details).* (Flight, Vol. 44, No. 1,810, 2/9/43, p. 250.)

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85	14083	G.B.	... ...	*Percival Proctor* (*Recognition Details*). (Flight, Vol. 44, No. 1,810, 2/9/43, p. 251.)
86	14085	G.B.	... ...	*Torpedo Beaufighter.* (Flight, Vol. 44, No. 1,810, 2/9/43,pp. 244, 253-255.)
87	14124	G.B.	... ...	*Trans-Atlantic Mosquito with Tanks Fitted to Wings* (*Photo*). (Aeroplane, Vol. 65, No. 1,684, 3/9/43, p. 261.)
88	14127	G.B.	... ...	*Bristol Beaufighter as Torpedo Bomber* (*Photograph*). (Aeroplane, Vol. 65, No. 1,684, 3/9/43, pp. 271-272.)
				Military Types of Aircraft (U.S.A.).
89	13202	U.S.A.	...	*Martin "Martian"* (*P. 26A*) (*Recognition Details*). (Flying and Industrial Aviation, Vol. 32, No. 1, January, 1943, p. 35.)
90	13204	U.S.A.	...	*Brewster "Buccaneer"* (*S.B.2.A.*) (*Recognition Details*). (Flying and Industrial Aviation, Vol. 32, No. 1, January, 1943, p. 36.)
91	13210	U.S.A.	...	*Development of the Ryan P.T. 25 Trainer.* (W. Vandermeer, Flying and Industrial Aviation, Vol. 32, No. 1, Jan., 1943. pp. 50, 128-130.)
92	13213	U.S.A.	...	*Navy Douglas S.B.D. 3* (*Photo*). (Flying and Industrial Aviation, Vol. 32, No. 1, Jan., 1943, p. 55.)
93	13218	U.S.A.	...	*Stinson "Sentinel"* (*L-5*) (*Photo*). (Flying and Industrial Aviation, Vol. 32, No. 1, Jan., 1943, p. 68.)
94	13309	U.S.A.	...	*The Martin B. 26* (*Marauder*). (Flight, Vol. 44, No. 1,809, 26/8/43, p. 219.)
95	13340	Canada	...	*Avro Lancasters on Special Airline Service.* (Flight, Vol. 44, No. 1,808, 19/8/43, p. 192.)
96	13377	U.S.A.	...	*North American Mitchells B. 25* (*Photograph*). (Flight, Vol. 44, No. 1,807, 12/8/43, pp. 172-173.)
97	13383	U.S.A.	...	*North American Mitchell* (*Photo*). (Aeroplane, Vol. 65, No. 1,680, 6/8/43, p. 145.)
98	13512	U.S.A.	...	*The Invader—American Dive Bomber* (*The North American A-36 Fighter Dive Bomber Version of the P-51 Mustang*). (Aeroplane, Vol. 65, No. 1,683, 27/8/43, p. 231.)
99	13517	U.S.A.	...	*Martin Marauder Two-Motor Medium Bomber* (*Photo*). (Aeroplane, Vol. 65, No. 1,683, 27/8/43, p. 236.)
100	13519	U.S.A.	...	*The Curtiss C. 76* (*Recognition Details*). (Aeroplane, Vol. 65, No. 1,683, 27/8/43, p. 247.)
101	13568	U.S.A.	...	*Aeronca PT-23 A.E. Primary Trainer* (*Drawings*). (American Aviation, Vol. 7, No. 3, 1/7/43, p. 70.)
102	13571	U.S.A.	...	*Mustang Adapted for Dive Bombing.* (Flying and Industrial Aviation, Vol. 32, No. 6, June, 1943, p. 43.)
103	13572	U.S.A.	...	*The Lockheed Lightning.* (Flying and Industrial Aviation, Vol. 32, No. 6, June, 1943, pp. 44-45, 162.)
104	13578	U.S.A.	...	*Boeing 314 Flying Boat* (*Recognition Details*). (Flying and Industrial Aviation, Vol. 32, No. 6, June, 1943, p. 62.)

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105	13579	U.S.A. ...	*Lockheed Constellation (Recognition Details).* (Flying and Industrial Aviation, Vol. 32, No. 6, June, 1943, p. 62.)
106	13632	U.S.A. ...	*The N.A. 73—Mustang (Photograph).* (Aeronautics, Vol. 8, No. 6, July, 1943, pp. 56-57.)
107	13756	U.S.A. ...	*Flying Ambulances (Piper HE-1 (Silhouette).* (American Exporter, Vol. 133, No. 1, July, 1943, p. 29.)
108	13773	U.S.A. ...	*The Vought-Sikorsky Helicopter VS-300.* (Aeronautics, Vol. 8, No. 5, June, 1943, pp. 62-63.)
109	13777	U.S.A. ...	*Fortress II or B17F. (Photograph).* (Aeronautics, Vol. 8, No. 5, June, 1943, p. 73.)
110	13801	U.S.A. ...	*Sikorsky R. 4 Helicopter (Photograph).* (Flight, Vol. 43, No. 1,801, 1/7/43, p. 5.)
111	13827	U.S.A. ...	*Mustang as a Fighter-Dive Bomber.* (Flight, Vol. 44, No. 1,805, July, 1943, p. 114.)
112	13852	U.S.A. ...	*Lockheed 18 Lodestar Transports Towing Waco CG-4A Gliders (Photo).* (Aeroplane, Vol. 65, No. 1,679, 30/7/43, p. 116.)
113	13942	U.S.A. ...	*The Vultee-Stinson L-5 Sentinel (Recognition Details).* (Aeroplane Spotter, Vol. 4, No. 91, 26/8/43, p. 195.)
114	14095	U.S.A. ...	*The New Version of the Liberator.* (Flight, Vol. 44, No. 1,810, 2/9/43, p. 261.)
115	14098	U.S.A. ...	*The Curtiss Seagull.* (Flight, Vol. 44, No. 1,810, 2/9/43, p. 266.)
116	14125	U.S.A. ...	*Vought-Sikorsky Y.R. 4 Helicopter Equipped with Amphibious Undercarriage (Photo).* (Aeroplane, Vol. 65, No. 1,684, 3/9/43, p. 264.)
117	14128	U.S.A. ...	*Lockheed P. 38 Lightnings Fitted Out for Photographic Reconnaissance Work (Photo).* (Aeroplane, Vol. 65, No. 1,684, 3/9/43, p. 273.)
			Military Types of Aircraft (U.S.S.R.).
118	13251	U.S.S.R. ...	*Iliuchin 1L-2 Stormoviks (Photograph).* (Aeroplane, Vol. 65, No. 1,682, 20/8/43, p. 216.)
119	13252	U.S.S.R. ...	*Iliuchin DB-3F Bombers (Photograph).* (Aeroplane, Vol. 65, No. 1,682, 20/8/43, p. 216.)
120	13282	U.S.S.R. ...	*The Russian Fighter Lagg-3.* (Aeroplane, Vol. 65, No. 1,681, 13/8/43, p. 175.)
121	13381	U.S.S.R. ...	*Russian Fighter Lagg-3.* (Flight, Vol. 44, No. 1,807, 12/8/43, pp. 178-180.)
122	13384	U.S.S.R. ...	*Tupolev T.B. 7 Four-Motor Heavy Bomber.* (Aeroplane, Vol. 65, No. 1,680, 6/8/43, p. 147.)
123	13527	U.S.S.R. ...	*The Petlyakov PE-2 (Recognition Details).* (Aeroplane, Vol. 65, No. 1,677, 16/7/43, p. 73.)
124	13791	U.S.S.R. ...	*New Russian Fighter LA. 5.* (Flight, Vol. 44, No. 1,802, 8/7/43, p. 32.)
			Military Types of Aircraft (Germany).
125	13207	Germany ...	*Ju. 87B Dive Bomber (Recognition Details).* (Flying and Industrial Aviation, Vol. 32, No. 1, January, 1943, p. 37.)
126	13250	Germany ...	*German Aircraft in Russia.* (N. Denisov, Aeroplane, Vol. 65, No. 1,682, 20/8/43, p. 216.)

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127	13287	Germany	...	*The Heinkel 177 (Recognition Details).* (Aeroplane, Vol. 65, No. 1,681, 13/8/43, p. 189.)
128	13339	Germany	...	*Messerschmitt 323 Transport (Photograph).* (Flight, Vol. 44, No. 1,808, 19/8/43, p. 191.)
129	13349	Germany	...	*Focke-Wulf F.W. 200C (Condor) (Photo).* (Flight, Vol. 44, No. 1,808, 19/8/43, p. 197.)
130	13350	Germany	...	*Heinkel He. 115 (Recognition Details).* (Flight, Vol. 44, No. 1,808, 19/8/43, p. 202.)
131	13376	Germany	...	*High Performance Fighters.* (K. Tank, Flight, Vol. 44, No. 1,807, 12/8/43, p. 171.)
132	13514	Germany	...	*Particulars of Enemy Aircraft (Air Ministry Release).* (Aeroplane, Vol. 65, No. 1,683, 27/8/43, p. 232.)
133	13577	Germany	...	*Dornier—217E (Silhouette).* (Flying and Industrial Aviation, Vol. 32, No. 6, June, 1943, p. 61.)
134	13581	Germany	...	*Junkers Ju. 90B (Recognition Details).* (Flying and Industrial Aviation, Vol. 32, No. 6, June, 1943, p. 63.)
135	13625	Germany	...	*Two Enemy Twin-Engined Aircraft, Me. 210 and Henschel 129.* (Aeronautics, Vol. 8, No. 6, July, 1943, p. 35.)
136	13766	Germany	...	*Comprehensive Survey of Focke Wulf F.W. 190 A-3 (M.G.'s Radio Equipment, etc.).* (Aeronautics, Vol. 8, No. 5, June, 1943, pp. 38-42.)
137	13771	Germany	...	*Gotha VI First Asymmetrical Aircraft.* (Aeronautics, Vol. 8, No. 5, June, 1943, p. 57.)
138	13787	Germany	...	*Ju. 87 as a Medical Test Plane.* (Diringshofen, Germany and You, Vol. 13, No. 6, June 15, 1943, pp. 154-155, 166.)
139	13800	Germany	...	*Further Details of Messerschmitt Me. 323.* (Flight, Vol. 44, No. 1,802, 8/7/43, p. 49.)
140	13831	Germany	...	*Messerschmitt Me. 108B Taifun (Recognition Details).* (Flight, Vol. 44, No. 1,805, July, 1943, p. 118a.)
141	13832	Germany	...	*Bucker Bu. 181 Bestmann (Recognition Details).* (Flight, Vol. 44, No. 1,805, July, 1943, p. 118b.)
142	13857	Germany	...	*Junkers Ju. 52/3m.F. (Recognition Details).* (Aeroplane, Vol. 65, No. 1,679, 30/7/43, p. 131.)
143	13860	Germany	...	*Improved Version of Ju. 87D (Photograph).* (Aeroplane, Vol. 65, No. 1,679, 30/7/43, p. 133.)
144	13944	Germany	...	*The Messerschmitt Me. 323 (Recognition Details).* (Aeroplane Spotter, Vol. 4, No. 91, 26/8/43, p. 198.)
145	14025	Germany	...	*Messerschmitt 210 A-1.* (Enemy Aircraft Reports (Issued by M.A.P.), 1943, p. 1.)
146	14026	Germany	...	*Messerschmitt Me. 323.* (Enemy Aircraft Reports (Issued by M.A.P.), 1943, p. 1.)
147	14028	Germany	...	*Me. 109 G-2.* (Enemy Aircraft Reports (Issued by M.A.P.), 1943, pp. 1-2.)
148	14029	Germany	...	*New German Aircraft Types (Me. 323).* (Enemy Aircraft Reports (Issued by M.A.P.), 1943, pp. 1-2.)
149	14030	Germany	...	*Ju. 86 BV. 222 DB. 606.* (Enemy Aircraft Reports (Issued by M.A.P.), 1943, pp. 1-2.)

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150	14034	Germany ...	*Dornier 217 E-1.* (Enemy Aircraft Reports (Issued by M.A.P.), 1943, pp. 1-9.)
151	14035	Germany ...	*Focke-Wulf 190 A-3.* (Enemy Aircraft Reports (Issued by M.A.P.), 1943, pp. 1-10.)
152	14081	Germany ...	*Henschel 129 Attack Bomber (Photo).* (Flight, Vol. 43, No. 1,810, 2/9/43, p. 247.)
153	14090	Germany ...	*Focke-Wulf F.W. 200 (Condor) (Photo).* (Flight, Vol. 44, No. 1,810, 2/9/43, p. 257.)
154	14091	Germany ...	*Junkers 290 (Photo).* (Flight, Vol. 44, No. 1,810, 2/9/43, p. 259.)
155	14129	Germany ...	*Captured Me. 109C (Photo).* (Aeroplane, Vol. 65, No. 1,684, 3/9/43, p. 275.)

Military Types of Aircraft (Italy).

156	13226	Italy	*Fiat B.R. 20 (Recognition Details).* (Flight, Vol. 44, No. 1,806, August 5, 1943, p. 144.)
157	13227	Italy	*Fiat G. 12 (Recognition Details).* (Flight, Vol. 44, No. 1,806, August 5, 1943, p. 145.)
158	13283	Italy	*Savoia-Marchetti S.M. 81 Pipistrello (Photo).* (Aeroplane, Vol. 65, No. 1,681, 13/8/43, p. 179.)
159	13308	Italy	*Cant Z-501 (Photograph).* (Flight, Vol. 44, No. 1,809, 26/8/43, p. 218.)
160	13342	Italy	*S.M. 84 Torpedo Bombers.* (Flight, Vol. 44, No. 1,808, 19/8/43, pp. 9, 193.)
161	13343	Italy	*Piaggio P. 108 Four-Engined Italian Bomber (Photo).* (Flight, Vol. 44, No. 1,808, 19/8/43, p. 193.)
162	13344	Italy	*Fiat B.R. 20 "Cicogna" Bomber (Photo).* (Flight, Vol. 44, No. 1,808, 19/8/43, p. 194.)
163	13345	Italy	*Macchi C. 202 Single-Seater Fighter (Photo).* (Flight, Vol. 44, No. 1,808, 19/8/43, p. 195.)
164	13346	Italy	*Reggiane Re. 2,000 Single-Seater Fighter (Photo).* (Flight, Vol. 44, No. 1,808, 19/8/43, p. 195.)
165	13351	Italy	*Fiat R.S. 14 (Recognition Details).* (Flight, Vol. 44, No. 1,808, 19/8/43, p. 203.)
166	13380	Italy	*Breda 88 (Recognition Details).* (Flight, Vol. 44, No. 1,807, 12/8/43, p. 177.)
167	13619	Italy	*New Italian Bomber—Piaggio P. 108.* (Trade and Engineering Times, Vol. 53, No. 951, May, 1943, p. 36.)
168	13807	Italy	*The Cant Z. 1,008 (Photograph).* (Flight, Vol. 43, No. 1,801, 1/7/43, p. 12.)
169	13808	Italy	*Savoia Marchetti SM. 82 (Canguru) (Recognition Details).* (Flight, Vol. 43, No. 1,801, 1/7/43, p. a.)
170	13809	Italy	*Savoia Marchetti SM. 83 (Recognition Details).* (Flight, Vol. 43, No. 1,801, 1/7/43, p. b.)
171	13858	Italy	*Savoia Marchetti SM. 82 Canguru (Recognition Details).* (Aeroplane, Vol. 65, No. 1,679, 30/7/43, p. 131.)
172	14092	Italy	*Savoia SM. 82 (Photo).* (Flight, Vol. 44, No. 1,810, 2/9/43, p. 250.)
173	14093	Italy	*Fiat G. 12 (Photo).* (Flight, Vol. 44, No. 1,810, 2/9/43, p. 260.)

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			Military Types of Aircraft (Rumania).
174	13805	Rumania	... *Rumania's Air Force (Obsolescent Types).* (Flight, Vol. 43, No. 1,801, 1/7/43, pp. 9-11.)
			Military Types of Aircraft (Japan).
175	13206	Japan	... *Nakajima 94 (Army) (Recognition Details).* (Flying and Industrial Aviation, Vol. 32, No. 1, January, 1943, p. 37.)
176	13286	Japan	... *The Mitsubishi Naval OB-01 (Recognition Details).* (Aeroplane, Vol. 65, No. 1,681, 13/8/43, p. 189.)
177	13316	Japan	... *Kawanishi T. 97 (Recognition Details).* (Flight, Vol. 44, No. 1,809, 26/8/43, p. 232.)
178	13382	Japan	... *New Japanese Aircraft.* (Aeroplane, Vol. 65, No. 1,680, 6/8/43, p. 145.)
179	13523	Japan	... *Nakajima G. 97.2 Torpedo Bomber (Photograph).* (Aeroplane, Vol. 65, No. 1,677, 16/7/43, p. 63.)
180	13941	Japan	... *The Mitsubishi Navy SHS-00 Float Plane Fighter (Recognition Details).* (Aeroplane Spotter, Vol. 4, No. 91, 26/8/43, p. 195.)
			Military Types of Aircraft (France).
181	13379	France	... *Caudron Goéland Transport Aircraft (Recognition Details).* (Flight, Vol. 44, No. 1,807, 12/8/43, p. 176.)
182	13385	France	... *Caudron Goéland Transport (Photo).* (Aeroplane, Vol. 65, No. 1,680, 6/8/43, p. 153.)
183	13790	France	... *Caudron C 440 Aircraft (Photograph).* (Flight, Vol. 44, No. 1,802, 8/7/43, p. 29.)
			Military Types of Aircraft (Sweden).
184	13311	Sweden	... *Sweden's New Fighter J. 22.* (Flight, Vol. 44, No. 1,809, 26/8/43, pp. 221-222.)
185	13281	Sweden	... *New Swedish Fighter—J. 22 (Photograph).* (Aeroplane, Vol. 65, No. 1,681, 13/8/43, p. 174.)
			Military Types of Aircraft (Argentine).
186	13826	Argentine	... *New Argentine Trainer Impa RR-11.* (Flight, Vol. 44, No. 1,805, July, 1943, p. 114.)
			Gliders and Gliding.
187	13209	U.S.A.	... *Pre-Glider Training.* (R. L. McIntyre, Flying and Industrial Aviation, Vol. 32, No. 1, Jan., 1943, pp. 45-46, 106.)
188	13288	U.S.A.	... *Unloading Waco CG-4A Glider (Photo).* (Aeroplane, Vol. 65, No. 1,681, 13/8/43, p. 196.)
189	13352	U.S.A.	... *Performance of Towed Gliders, American Views.* (Flight, Vol. 44, No. 1,808, 19/8/43, pp. 204-205.)
190	13520	U.S.A.	... *The Waco C.G.-4A Hadrian I American Transport Glider (Recognition Details).* (Aeroplane, Vol. 65, No. 1,683, 27/8/43, p. 247.)
191	13559	U.S.A.	... *Amphibious Transport Glider (Photograph).* (American Aviation, Vol. 7, No. 3, 1/7/43, p. 17.)
192	13589	U.S.A.	... *Glider Pilot Training.* (J. Stuart, Flying and Industrial Aviation, Vol. 32, No. 6, June, 1943, pp. 119-122, 130, 135.)

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193	13786	Germany ...	*Gliding as Pre-Military Training.* (W. Wagner, Germany and You, Vol. 13, No. 6, June 15, 1943, pp. 149-150.)
194	13789	G.B. ...	*Glider Flight Across the Atlantic.* (Flight, Vol. 44, No. 1,802, 8/7/43, p. 28.)
195	13802	U.S.A. ...	15 *Seater CG Glider (Photograph).* (Flight, Vol. 43, No. 1,801, 1/7/43, p. 6.)
196	13954	G.B. ...	*Glider Crosses Atlantic, Future Possibilities.* (Times, Trade and Engg., Vol. 53, No. 954, Aug., 1943, p. 34.)
197	13955	Germany ...	*A "Powered" Glider—Six-Engined M.E.* 323. (Times, Trade and Engg., Vol. 53, No. 954, Aug., 1943, p. 34.)
198	14094	Germany ...	*D.F.S. 230 Glider (Photo).* (Flight, Vol. 44, No. 1,810, 2/9/43, p. 261.)
			Fleet Air Arm, A/C. Carriers.
199	13365	G.B. ...	*Ship Flying and Aircraft Carriers—IV.* (P. Bethell, Engineering, Vol. 156, No. 4,049, 20/8/43, pp. 141-144.)
200	13755	U.S.A. ...	*Floating Sea Bases.* (American Exporter, Vol. 133, No. 1, July, 1943, p. 28.)
201	13838	G.B. ...	*Ship Flying and Aircraft Carriers—IV.* (P. Bethell, Engineering, Vol. 156, No. 4,050, 27/8/43, pp. 161-163.)
202	13870	U.S.A. ...	*Naval Armament—Sea and Air Weapons of Our First Line of Defence.* (W. H. P. Blandy, Army Ordnance, Vol. 25, No. 139, July-Aug., 1943, pp. 81-86.)
203	13902	U.S.A. ...	*Naval Aviation—Then and Now.* (Trade Winds, Vol. 6, No. 12, June, 1943, pp. 4-6, 18.)
204	13929	G.B. ...	*Ship Flying and Aircraft Carriers—II.* (P. Bethell, Engineering, Vol. 156, No. 4,045, 23/7/43, pp. 61-63.)
205	14016	G.B. ...	*Ship Flying and Aircraft Carriers—II.* (P. Bethell, Engineering, Vol. 156, No. 4,044, 16/7/43, pp. 41-44 and 50.)
206	14126	G.B. ...	*Shipborne Air Power.* (Aeroplane, Vol. 65, No. 1,684, 4/9/43, pp. 267-270.)
			Servicing and Maintenance.
207	13202	U.S.A. ...	*Aircraft Maintenance in the Desert.* (R. Toland, Flying and Industrial Aviation, Vol. 32, No. 1, January, 1943, pp. 29, 104-106.)
208	13376	G.B. ...	*W.R.N.S. Air Mechanics.* (Aeroplane, Vol. 65, No. 1,680, 6/8/43, pp. 155-158.)
209	14163	G.B. ...	*Military Airport Paved with Concrete in Near-Zero Weather Using Special Technique to Beat Rush Schedule.* (Aerodrome Abstracts (Nos. 78-100), Vol. 11, No. 5, September, 1943, p. 3.)
210	14167	Canada ...	*Winter Maintenance Methods for R.C.A.F. Airfields.* (Aerodrome Abstracts (Nos. 78-100), Vol. 11, No. 5, September, 1943, p. 6.)
			A.R.P. and Balloons.
211	13439	G.B. ...	*Sky Ships.* (A. C. Hardy, Pet. Times, Vol. 47, No. 1,195, 15/5/43, pp. 227 and 237.)

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212	13635	U.S.A. ...	*New American Light Weight Gas Masks.* (Aeronautics, Vol. 8, No. 6, July, 1943, p. 66.)
213	13915	U.S.A. ...	*U.S. Barrage Balloons.* (R. G. Picinich, Sci. Am., Vol. 169, No. 1, July, 1943, pp. 6-8.)

AERODYNAMICS AND HYDRODYNAMICS.

Aerodynamic Theory.

214	12714	Germany ...	*On an Approximate Method for Determining the Two-Dimensional Potential Flow of a Compressible Fluid.* (W. Grobier, L.F.F., Vol. 20, No. 6, June 30, 1943, pp. 184-191.)
215	13194	G.B.	*Nozzles for Steam and Air Flow.* (Mechanical World, Vol. 113, No. 2,943, 28/5/43, p. 598.)
216	13936	G.B.	*The Properties of Fluids.* (S. C. Bradford, Phil. Mag., Vol. 34, No. 234, July, 1943, pp. 433-471.)
217	14037	Germany ...	*The Theory of Compressible Potential Flow (III) (Characteristics, Bicharacteristics and Eikonal of the Linearised Fundamental Equation).* (M. Pinl, Z.A.M.M., Vol. 22, No. 6, Dec., 1942, pp. 305-311.)
218	14057	U.S.A. ...	*Correlating Fluid Viscosity.* (A. S. Smith and others, Ind. Eng. Chemistry (Ind. Edition), Vol. 35, No. 6, June, 1943, pp. 705-711.)
219	14235	U.S.A. ...	*Aerodynamic Centre, Control and Stability of Aeroplanes.* (H. Reissner, Transactions of the A.S.M.E., Vol. 65, No. 6, August, 1943, pp. 625-628.)
220	14437	U.S.A. ...	*Aerodynamic Considerations of Rotors in Hovering and Vertical Climb Conditions.* (C. H. Kaman, Aeronautical Sciences, Vol. 10, No. 7, July, 1943, pp. 201-208.)
221	14441	U.S.A. ...	*Regions of Infinite Acceleration and Flow Realms in a Compressible Fluid.* (M. C. Scherberg, Aeronautical Sciences, Vol. 10, No. 7, July, 1943, pp. 223-226, 231.)
222	14489	G.B.	*Wind Power for Small Generating Plants.* (Electrical Review, Vol. 133, No. 3,430, August 20, 1943, p. 246.)
223	14552	G.B.	*Bibliographies of Published Information on Wind Tunnels.* (R.T.P. 3 Bibliographies, No. 88, Sept., 1943.)

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224	13818	G.B.	*Steering Experiments (Ship's Rudder) (Contd.).* (R. W. L. Gawn, Engineer, Vol. 176, No. 4,572, 27/8/43, pp. 175-176.)
225	13928	G.B.	*Steering Experiments.* (R. W. L. Gawn, Engineer, Vol. 176, No. 4,568, 30/7/43, pp. 97-98.)
226	13930	G.B.	*Modern Liquid State Theory in Relation to Engineering.* (R. S. Silver, Engineering, Vol. 156, No. 4,045, 23/7/43, pp. 64-65.)
227	14073	Switzerland ...	*A Hydraulic Ram Working on Wave Propagation (Contd.).* (G. Eichelberg, Schweizerische Bauzeitung, Vol. 120, No. 17, Oct. 24, 1942, pp. 191-193.) (Engineers' Digest, Vol. 4, No. 6, June, 1943, pp. 174-175.)

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228	14208	G.B.	*Water Circulation in Steam Boilers.* (J. Webster, Mechanical World, Vol. 114, No. 2,950, August 27, 1943, pp. 227-230.)
229	14453	G.B.	*Fluid Mechanics and Statistical Methods in Engineering (Book Review).* (H. L. Dryden, T. von Kármán and others, Nature, Vol. 152, No. 3,848, July 31, 1943, p. 119.)
230	14481	G.B.	*Boiler Hydraulics (Allowances for Friction and Other Losses)—II.* (J. Webster, Mechanical World, Vol. 114, No. 2,957, September 3, 1943, pp. 265-267.)
231	14508	G.B.	*The Derivation of the Tidal Equations.* (H. Jeffreys, Proceedings of the Royal Society, Vol. 181, No. 984, September 24, 1942, pp. 20-22.)
232	14511	G.B.	*On the Generation of Waves on Shallow Water by Wind.* (H. Pondi, Proceedings of the Royal Society, Vol. 181, No. 984, September 24, 1942, p. 67.)
233	14839	G.B.	*Water Circulation in Steam Boilers—III. The Principle of Forced Circulation.* (J. Webster, Mechanical World, Vol. 114, No. 2,958, September 10, 1943, pp. 308-312.)

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234	13233	U.S.A. ...	*Air Transport—Past and Future.* (W. W. Davis, Mechanical Engg., Vol. 65, No. 7, July, 1943, pp. 471-485.)
235	13248	G.B.	*The Evil of Transport Monopoly.* (Sir A. Cobham, Aeroplane, Vol. 65, No. 1,682, August 20, 1943, pp. 212-213.)
236	13254	G.B.	*International Control of Air Services.* (Aeroplane, Vol. 65, No. 1,682, August 20, 1943, p. 225.)
237	13322	U.S.A. ...	*25 Years of Air Mail Service.* (C. P. Craddick, U.S. Air Services, Vol. 28, No. 2, June, 1943, pp. 14-16.)
238	13353	G.B.	*Recommendations of Four M.P.s on Air Transport Policy.* (Flight, Vol. 44, No. 1,808, August 19, 1943, pp. 206-207.)
239	13450	G.B.	*Commercial Air Transport.* (F. Handley Page, Mech. World, Vol. 113, No. 2,946, 18/6/43, pp. 663-664.)
240	13530	G.B.	*Post-War International Air Transport.* (Aeroplane, Vol. 65, No. 1,677, 16/7/43, p. 82.)
241	13590	Canada ...	*Canadian Pacific Airlines.* (B. Keith, Flying and Industrial Aviation, Vol. 32, No. 6, June, 1943, pp. 28-30, 152.)
242	13621	G.B.	*Fundamentals of Air Transport.* (G. E. Woods Humphery, Aeronautics, Vol. 8, No. 6, July, 1943, pp. 28-30.)
243	13793	G.B.	*Air Transport. Post-War Policy. (Address to Royal Empire Society.)* (Sir F. Sykes, Flight, Vol. 44, No. 1,802, July 8, 1943, pp. 36-37.)

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244	13794	G.B.	*Air Transport for London.* (Flight, Vol. 44, No. 1,802, July 8, 1943, p. 37.)
245	13803	G.B.	*S.B.A.C. and Air Transport.* (Flight, Vol. 43, No. 1,801, July 1, 1943, p. 7.)
246	13904	U.S.A. ...	*New Flight Advisory Service of the C.A.A.* (Civil Aeronautics Journal, Vol. 4, No. 7, 5/7/43, p. 89.)
247	13905	U.S.A. ...	*Aviation—Nation's Largest Industry.* (C. I. Stanton, Civil Aeronautics Journal, Vol. 4, No. 7, 5/7/43, p. 91.)
248	13906	U.S.A. ...	*Analysis of Non-Air Carrier Accidents, 1942.* (Civil Aeronautics Journal, Vol. 4, No. 7, 5/7/43, p. 93.)
249	14131	G.B.	*Foodstuffs by Air.* (Aeroplane, Vol. 65, No. 1,684, 3/9/43, p. 280.)
250	14161	G.B.	*Air Transport and Civil Aviation Year Book. London, 1943 (Ford Publishing Co.).* (Aerodrome Abstracts (Nos. 78-100), Vol. 11, No. 5, September, 1943, p. 1.)
			Civil and Special Aircraft Types.
251	13222	Germany ...	*The Horten IV—Tailless All-Wing Aircraft.* (Flight, Vol. 44, No. 1,806, August, 1943, pp. 139-140.)
252	13253	U.S.A. ...	*The Kaiser-Hughes HK-1 Cargo Flying Boat.* (Aeroplane, Vol. 65, No. 1,682, August 20, 1943, p. 224.)
253	13255	G.B.	*D.H. Mosquitoes for Civil Transport.* (Aeroplane, Vol. 65, No. 1,682, August 20, 1943, pp. 200-224.)
254	13375	G.B.	*The Tandem Monoplane (Historic Interest).* (Flight, Vol. 44, No. 1,807, 12/8/43, pp. 167-168.)
255	13613	G.B.	*Henson's Aeroplane.* (Trade and Engineering Times, Vol. 53, No. 951, May, 1943, p. 32.)
256	13617	G.B.	*The Heston Racer.* (Trade and Engineering Times, Vol. 53, No. 951, May, 1943, p. 36.)
257	13758	U.S.A. ...	*New Cargo Plane—Cessna "Loadmaster."* (American Exporter, Vol. 133, No. 1, July, 1943, p. 29.)
258	13765	G.B.	*The Civil Strato Plane.* (D. C. Greenwood, Aeronautics, Vol. 8, No. 5, June, 1943, pp. 33-35.)
259	13959	G.B.	*Airworthiness of Civil Aircraft (Handbook).* (Times, Trade and Engineering, Vol. 53, No. 954, August, 1943, p. 36.)
			General Design and Construction.
260	13456	U.S.A. ...	*Wing Weight Estimating Simplified (S.A.W.E. Paper No. 20).* (C. R. E. Englebry, Paper Presented at S.A.W.E. Meeting, 7/5/43.)
261	13457	U.S.A. ...	*Engineering Progress and Cost Control (S.A.W.E. Paper No. 21).* (E. E. Roberts, Paper Presented at S.A.W.E. Meeting, 29/4/43.)
262	13458	U.S.A. ...	*Preliminary Design—Equations for Aircraft Weight Estimation (S.A.W.E. Paper No. 22).* (W. Simon, Paper Presented at S.A.W.E. Meeting, April 27-29, 1943.)
263	13460	U.S.A. ...	*Wood Can Save Weight (S.A.W.E. Paper No. 24).* (J. M. Jacobson, Paper Presented at S.A.W.E. Meeting, Aug. 6, 1943.)

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264	13461	U.S.A. ...	*The Significance of Weight Control (S.A.W.E. Paper No. 27).* (J. E. Ayers, Paper Presented at S.A.W.E. Meeting, 7/5/43.)
265	13570	U.S.A. ...	*Plastic Bonded Plywood Aircraft.* (W. Winter, Flying and Industrial Aviation, Vol. 32, No. 6, June, 1943, pp. 34-36, 175.)
266	13586	U.S.A. ...	*Plywood Binding Nut (Used for Fastening Metal and Wood.* (Flying and Industrial Aviation, Vol. 32, No. 6, June, 1943, p. 112.)
267	13626	G.B.	*Plastics and Metals for Structural Units—A Critical Comparison.* (J. S. Trevor, Aeronautics, Vol. 8, No. 6, July, 1943, pp. 36-37.)
268	13627	G.B.	*The Aircraft Tail Unit.* (W. E. Hick, Aeronautics, Vol. 8, No. 6, July, 1943, pp. 38-40.)
269	13633	U.S.A. ...	*Bendix Landing Gear Patent (Wheel Automatically Rotated by an Electric Motor).* (Aeronautics, Vol. 8, No. 6, July, 1943, p. 62.)
270	13653	Canada ...	*Canadian Plastic Skis.* (Aircraft Productions, Vol. 5, No. 58, August, 1942, p. 363.)
271	13656	G.B.	*Alternative Materials for Supplementary Fuel Tanks.* (Aircraft Production, Vol. 5, No. 58, August, 1942, pp. 376-377.)
272	13657	G.B.	*Spring Undercarriages.* (Aircraft Production, Vol. 5, No. 58, August, 1942, p. 377.)
273	13767	G.B.	*Cockpit Classification.* (G. White, Aeronautics, Vol. 8, No. 5, June, 1943, pp. 50-52.)
274	13916	U.S.A. ...	*S.A.W.E. Weight Handbook (Preprint).* (Vol. 2, Section 11, Armament, 1943.)
275	13917	U.S.A. ...	*S.A.W.E. Weight Handbook (Preprint).* (Vol. 2, Section 11, Propeller Equipment, 1943.)
276	13990	U.S.A. ...	*Wooden Aircraft Problems.* (Sci. Am., Vol. 169, No. 1, July, 1943, p. 41.)
277	14069	U.S.A. ...	*Problems in Aircraft Structural Research.* (F. R. Shanley, Engineers' Digest, Vol. 4, No. 6, June, 1943, pp. 166-168.)
278	14123	G.B.	*New Type of Landing Gear Incorporating a Caterpillar Track (Photo).* (Aeroplane, Vol. 65, No. 1,684, 3/9/43, p. 259.)
279	14130	G.B.	*Glenn Martin Design for Post-War Freight Carrying Aeroplanes.* (Aeroplane, Vol. 65, No. 1,684, 3/9/43, p. 280.)

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281	13473	U.S.A. ...	*Aircraft Structural Testing.* (B. L. Springer, Paper Presented at S.A.E. Meeting, Jan. 11 and 15, 1943.)
282	13574	U.S.A. ...	*Airline Fuel Consumption (II).* (M. G. Beard, Flying and Industrial Aviation, Vol. 32, No. 6, June, 1943, pp. 59, 90-94.)

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283	13836	Germany ...	*German Pressure Chambers for Altitude Research (Photo).* (Flight, Vol. 44, No. 126, July, 1943, p. 126.)
284	13851	U.S.S.R. ...	*Experimental Investigation of Impact in Landing on Water.* (R. L. Kreps, N.A.C.A. Technical Memorandum, No. 1,046, August, 1943.)
285	13991	U.S.A. ...	*Gliders Proposed to Assist Take-Off.* (Sci. Am., Vol. 169, No. 1, July, 1943, p. 42.)
			Airscrews and Helicopters.
286	13775	G.B.	*Aeroturbine Screw Propeller (Patent).* (Aeronautics, Vol. 8, No. 5, June, 1943, p. 63.)
287	13830	G.B.	*Rotol V.P. Marine Propeller.* (Flight, Vol. 44, No. 1,805, July, 1943, p. 118.)
288	13853	G.B.	*Rotol V.P. Propellers for Ships.* (Aeroplane, Vol. 65, No. 1,679, 30/7/43, p. 117.)
289	13926	G.B.	*Rotol V.P. Marine Propellers.* (Engineer, Vol. 176, No. 4,568, 30/7/43, pp. 87-88.)
290	13948	G.B.	*Variable Pitch Propellers in Motor Shipbuilding.* (Times, Trade and Engineering, Vol. 53, No. 954, August, 1943, p. 30.)
291	13956	G.B.	*Airscrew Evolution—from Car to Propeller.* (Times, Trade and Engineering, Vol. 53, No. 954, August, 1943, p. 35.)
292	13988	U.S.A. ...	*Helicopter Progress.* (A. Klemin, Sci. Am., Vol. 169, No. 1, July, 1943, p. 40.)
293	14021	G.B.	*Marine Propeller Blade Deflection.* (J. F. C. Conn, Engineering, Vol. 156, No. 4,044, 16/7/43, pp. 58-60.)
			Airports and Maintenance.
294	13217	U.S.A. ...	*Control Tower for Airport Operations.* (C. Crowley, Flying and Industrial Aviation, Vol. 32, No. 1, January, 1943, pp. 67, 126-128.)
295	13616	G.B.	*Use of Camouflage.* (Trade and Engineering Times, Vol. 53, No. 951, May, 1943, p. 35.)
296	13817	G.B.	*Local Soil Stabilised with Cement Used for Paving American Airports.* (Engineer, Vol. 176, No. 4,572, 27/8/43, p. 174.)
297	13828	G.B.	*Design for a London Airport.* (Flight, Vol. 44, No. 1,805, July, 1943, p. 115.)
298	13841	G.B.	*The Stabilisation of Soil by Cement.* (Engineering, Vol. 156, No. 4,050, 27/8/43, pp. 165, 170.)
299	13859	G.B.	*Design for a Post-War Airport.* (Aeroplane, Vol. 65, No. 1,679, 30/7/43, p. 132.)
300	13952	G.B.	*A London Airport.* (Times, Trade and Engineering, Vol. 53, No. 954, August, 1943, p. 32.)
301	14017	G.B.	*Problems of Land Drainage.* (E. Latham, Engineering, Vol. 156, No. 4,044, 16/7/43, pp. 44-45.)
302	14145	G.B.	*The Rôle of Moisture in Soil Mechanics.* (R. K. Schofield, Chemistry and Industry, Vol. 62, No. 36, 4/9/43, pp. 339-341.)

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303	14162	G.B.	*Public Works Engineers Year Book*, 1943, *including Proceedings of the* 1942 *Public Works Congress (Data on the Layout and Drainage of Airports, Runway Design for Heavy Aircraft Wheel Loads, etc.).* (Aerodrome Abstracts (Nos. 78-100), Vol. 2, No. 5, September, 1943, p. 1.)
304	14164	U.S.A. ...	*Heavy Duty Asphaltic Runways.* (B. E. Gray, Aerodrome Abstracts (Nos. 78-100), Vol. 11, No. 5, September, 1943, pp. 3-4.)
305	14165	U.S.A. ...	*Camouflage Paints and Their Application to Road and Building Surfaces.* (L. G. Gabriel, Aerodrome Abstracts (Nos. 78-100), Vol. 11, No. 5, September, 1943, p. 5.)
306	14166	U.S.A. ...	*Maintenance of Aircraft Runways Surfaces in Winter (U.S. Civil Aeronautics Board).* (Aerodrome Abstracts (Nos. 78-100), Vol. 11, No. 5, September, 1943, p. 6.)
307	14168	Canada ...	*Wartime Experience in Runway Clearance.* (T. Roberts, Aerodrome Abstracts (Nos. 78-100), Vol. 11, No. 5, September, 1943, pp. 6-7.)

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Named Types.

308	13284	Germany ...	*The Junkers Jumo 211B, Series I, Aero Motor.* (Aeroplane, Vol. 65, No. 1,681, 13/8/43, pp. 181-182.)
309	13314	Germany ...	*The Junkers Jumo 211 Series.* (Flight, Vol. 44, No. 1,809, 26/8/43, pp. 228-231.)
310	13388	Germany ...	*The Junkers Jumo 211A Aero Engine (M.A.P. Report).* (Aeroplane, Vol. 65, No. 1,680, 6/8/43, pp. 165-167.)
311	13524	Germany ...	*The Mercedes-Benz DB. 601A (M.A.P. Report).* (Aeroplane, Vol. 65, No. 1,677, 16/7/43, pp. 66-69.)
312	13585	U.S.A. ...	*The 220 h.p. Lycoming (Photograph).* (Flying and Industrial Aviation, Vol. 32, No. 6, June, 1943, p. 110.)
313	13654	G.B.	*The Cheetah X Engine, Pt. I, Performance and Design. Machining the Crankshaft and Master Connecting Rod.* (J. A. Oates, Aircraft Production, Vol. 5, No. 58, Aug., 1942, pp. 364-375.)
314	13741	G.B.	*Bristol Hercules Sleeve Valve Engine (Schematic Drawing).* (Air Tech., Vol. 3, No. 1, 15/7/43, p. 49.)
315	13757	U.S.A. ...	*Ranger 12-Cylinder In-Line Inverted "V" Air-Cooled Aircraft Engine.* (American Exporter, Vol. 133, No. 1, July, 1943, p. 29.)
316	13823	Germany ...	*Series Modifications to Junkers Jumo 211 Engines.* (M.A.P. Reports on Enemy Aircraft, Aug., 1943.)
317	13824	Germany ...	*Heinkel H.E. 111H. Examination of Jumo 211J Engine, including Installation.* (M.A.P. Reports on Enemy Aircraft, Aug., 1943.)
318	13825	Germany ...	*Junkers Ju. 88A1. Examination of Engines 2 Jumo 211B (1) Installation and Fuel and Oil System.* (M.A.P. Reports on Enemy Aircraft, Aug., 1943.)

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319	13903	U.S.A. ...	*The Cyclone* 14. (Trade Winds, Vol. 6, No. 12, June, 1943, pp. 14-16.)
320	13958	Germany ...	*New German Engines. M.A.P. Examinations.* (Times, Trade and Engg., Vol. 53, No. 954, Aug., 1943, p. 36.)
321	14023	Germany ...	*Examination of Mercedes-Benz D.B. 601N and D.B. 601 N1. Engines and Installation of Messerschmitt 109 E7 and 109 F1/2.* (Enemy Aircraft Reports (Issued by M.A.P.), 1943, pp. 1-7.)
322	14024	Germany ...	*Examination of Mercedes-Benz D.B. 601A Engines, Mountings and Cooling Systems of M.E. 109, M.E. 110 and Heinkel H.E. 111P.* (Enemy Aircraft Reports (Issued by M.A.P.), 1943, pp. 1-18.)
323	14031	Germany ...	*Examination of B.M.W. 132K (1) and 132N Engines of Heinkel 115 Seaplane and Dornier 17P Aeroplane.* (Enemy Aircraft Reports (Issued by M.A.P.), 1943, pp. 1-7.)
324	14032	Germany ...	*Examination of Bramo-Fafnir 323 P-1 Engine and Installation of Dornier 17Z.* (Enemy Aircraft Reports (Issued by M.A.P.), 1943, pp. 1-15.)
325	14036	Germany ...	*Examination of B.M.W. 801 A/1 Engines of Dornier 217 E/1.* (Enemy Aircraft Reports (Issued by M.A.P.), 1943, pp. 1-24.)
			Diesel Engines.
326	13468	U.S.A. ...	*Control and Suppression of Diesel Engine Noise, Theory and Practice.* (R. L. Leadbetter, Paper Presented at S.A.E. Meeting, June 2 and 3, 1943.)
327	13471	U.S.A. ...	*The Fairbanks-Morse Diesel Engine as a Research Tool for Pre-Evaluation of Heavy Duty Motor Oils.* (H. L. Noir and others, Paper Presented at S.A.E. Meeting, June 2 and 3, 1943.)
328	13475	U.S.A. ...	*Comparison of Laboratory Diesel Engine Tests with Service Performance.* (Wetmiller, R., Paper Presented at S.A.E. Meeting, June 2 and 3, 1943.)
329	13476	U.S.A. ...	*Development of a Light Weight Diesel Engine.* (J. C. Fetters, Papers Presented at S.A.E. Meeting, June 2 and 3, 1943.)
330	13478	U.S.A. ...	*Diesel Maintenance in the Fleet.* (R. J. Moore, Paper Presented at S.A.E. Meeting, June 2 and 3, 1943.)
331	13669	U.S.A. ...	*Marine Diesel Auxiliaries (Installation Problems).* (R. L. Boyer, Mech. Engg., Vol. 65, No. 6, June, 1943, pp. 431-432.)
			Accessories (Cylinders, Rings, etc.).
332	13200	G.B.	*Aluminium Aircraft Engine Parts (Abstract of S.A.E. Paper).* (Light Metals, Vol. 6, No. 65, June, 1943, p. 310.)
333	13291	U.S.A. ...	*Supercharger Installed as an Integral Part of the Power Plant.* (Scientific American, Vol. 169, No. 2, Aug., 1943, pp. 88-89.)

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334	13423	G.B. ...	... *Compression Rings.* (M. O. Teetor, Autom. Eng., Vol. 33, No. 436, May, 1943, pp. 185-186.)
335	13453	G.B. ...	... *Nozzles for Steam and Air Flow.* (Mech. World, Vol. 113, No. 2,946, 18/6/43, pp. 684-685.)
336	13465	U.S.A.	... *Substitution for Aluminium in Brake Cylinder Pistons.* (J. F. Bachman, Paper Presented at S.A.E. Meeting, June 9-10, 1943.)
337	13490	G.B. ...	... *High Speed Helical Gears and the Elimination of Transmission Noises.* (Machinery, Vol. 62, No. 1,597, 20/5/43, p. 552.)
338	13507	G.B. ...	... *Nozzles for Steam and Air Flow.* (Mechanical World, Vol. 113, No. 2,945, 11/6/43, p. 655.)
339	13549	G.B. ...	... *Nozzles for Steam and Air Flows.* (Mechanical World, Vol. 113, No. 2,944, 4/6/43, p. 626.)
340	13850	G.B. ...	... *Flexible Shaft Couplings.* (W. Steeds, Engineering, Vol. 156, No. 4,050, 27/8/43, p. 174.)
			Turbines, Pumps, Boilers.
341	13183	G.B. ...	... *Centrifugal Pumps Inlet and Cavitation.* (A. P. MacPulworth, Mechanical World, Vol. 114, No. 2,953, 6/8/43, pp. 143-146.)
342	13356	G.B. ...	... *Regenerative Feed Heating in Steam Turbine Installations.* (W. Wadkin, Mechanical World, Vol. 114, No. 2,954, 13/8/43, pp. 175-178.)
343	13362	G.B. ...	... *Centrifugal Pumps, Inlet and Cavitation—II.* (A. P. MacPulworth, Mechanical World, Vol. 114, No. 2,954, 13/8/43, pp. 188-191.)
344	13363	U.S.S.R.	... *Ramzin's Uniflow Boiler. Extensive Development in Russia.* (Mechanical World, Vol. 114, No. 2,954, 13/8/43, p. 194.)
345	13392	G.B. ...	... *Natural Circulation Water Tube Boilers, 1932 to Date.* (Sci. Lib. Bibling. Series, No. 591, 1943.)
346	13505	G.B. ...	... *Boiler Water Treatment.* (Mechanical World, Vol. 113, No. 2,945, 11/6/43, p. 650.)
347	13509	G.B. ...	... *Turbine Blade Deposits.* (D. W. Rudorff, Met. Vick. News Bull., No. 866, 14/5/43, p. 4.)
348	13510	G.B. ...	... *Steam Turbine Vibration.* (Met. Vick. News Bull., No. 866, 14/5/43, p. 7.)
349	13675	U.S.A.	... *Victor-Acme Position Displacement Gas Pumps.* (Mech. Engg., Vol. 65, No. 6, June, 1943, p. 36.)
			Oil and Steam Engines.
350	13718	G.B. ...	... *The Honn Oil Engine.* (Automobile Engineer, Vol. 33, No. 437, June, 1943, p. 238.)
351	13815	G.B. ...	... *Oil Engines for Landing Craft.* (Engineer, Vol. 176, No. 4,572, 27/8/43, pp. 171-172.)
352	13845	G.B. ...	... *Oil Engines for Landing Craft.* (Engineering, Vol. 156, No. 4,050, 27/8/43, pp. 174-175.)
353	13947	G.B. ...	... *High Speed Oil Engines.* (Times, Trade and Engg., Vol. 53, No. 954, Aug., 1943, p. 28.)
354	13949	G.B. ...	... *Cargo Ship Propulsion—Steam Reciprocating Engines.* (Times, Trade and Engg., Vol. 53, No. 954, Aug., 1943, p. 30.)
			Testing and Efficiency.
355	13229	Germany	... *Type Testing the Jumo 211D.* (Flight, Vol. 44, No. 1,806, August 5, 1943, p. 147.)

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356	13431	G.B.	...	*Control of Oil Consumption in High Speed Oil Engines.* (Autom. Eng., Vol. 33, No. 436, May, 1943, p. 200.)
357	13715	G.B.	...	*Cylinder Temperatures Accurately Recorded by Means of Thermocouple Sparking Plugs.* (Automobile Engineer, Vol. 33, No. 437, June, 1943, p. 228.)
358	13821	G.B.	...	*Bench Tests of Jumo 211D Engines.* (M.A.P. Reports on Enemy Aircraft, Aug., 1943.)
359	13822	G.B.	...	*Detail Examination of Fuel Injection Pumps from Jumo 211A, Series 1, 2,113, Series 1, and 211D, Series 1, Engines.* (M.A.P. Reports on Enemy Aircraft, Aug., 1943.)
				Servicing.
360	13712	G.B.	...	*Protection of Engines and Vehicles in Storage.* (P. V. Lamarque, I.A.E. Automobile Research Committee, No. 1,943/6.)
361	13738	U.S.A.	...	*Servicing the Allison V-12 (Liquid-Cooled) Engine.* (C. B. F. Macauley, Air Tech., Vol. 3, No. 1, 15/7/43, pp. 19-33.)
362	13812	G.B.	...	*Pre-Heating the Engines of a Mitchell at an Alaskan Airfield (Photograph).* (Flight, Vol. 43, No. 1,801, 1/7/43, p. 22.)
363	13798	G.B.	...	*How "Bristol" Power Units are Repaired.* (Flight, Vol. 44, No. 1,802, 8/7/43, pp. 42-45.)
				General Problems.
364	13434	G.B.	...	*Motor Cycle Engines.* (Autom. Eng., Vol. 33, No. 436, May, 1943, pp. 209-210.)
365	13719	G.B.	...	*Exhaust Gases.* (J. J. Mikita and others, Automobile Engineer, Vol. 33, No. 437, June, 1943, pp. 239-240.)
366	13993	G.B.	...	*Exhaust Pipe Phenomena.* (G. F. Mucklow, J. Am. Soc. Nav. Engs., Vol. 55, No. 2, May, 1943, pp. 343-361.)
367	14068	G.B.	...	*Progress in Engineering Knowledge during 1942.* (P. L. Algen and J. Stokley, Engineers' Digest, Vol. 4, No. 6, June, 1943, pp. 161-166.)
368	14077	Germany	...	*Recent Development of Two-Stroke Engines (Scavenging Problems).* (Z.V.D.I., Vol. 87, Nos. 1-2, Jan., 1943, pp. 7-14.) (J. Zeman, Engineer and Digest, Vol. 4, No. 6, June, 1943, pp. 181-184.)
369	14079	Germany	...	*Engine Cooling Problems Arising in Motor Car Design.* (A.T.Z., Vol. 45, No. 9, May, 1942, Pt. 1, pp. 232-238.) (B. Eckert, Engineers' Digest, Vol. 4, No. 6, June, 1943, pp. 185-188.)
				FUELS AND LUBRICANTS.
				Fuels—General Purpose.
370	13370	U.S.A.	...	*Recent Refining Developments in the U.S.A.* (National Petroleum News, Vol. 35, No. 26, 30/6/43, pp. 5-6.)

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371	13425	G.B.	*Universal Fuel.* (C. Ridley, Autom. Eng., Vol. 33, No. 436, May, 1943, pp. 187-190.)
372	13437	G.B.	*Low Octane Fuel for Commercial Vehicle Engines.* (Autom. Eng., Vol. 33, No. 436, May, 1943, pp. 216.)
373	13445	G.B.	*Peace Time Values from a War Technology.* (G. Egloff, J. Inst. Pet., Vol. 29, No. 233, May, 1943, pp. 133-145.)
374	13446	G.B.	*Collection of Abstracts.* (J. Inst. Pet., Vol. 29, No. 233, May, 1943, pp. 150A-197A.)
375	13469	U.S.A. ...	*The Influence of Diesel Fuel Properties of Engine Deposits and Wear.* (G. H. Cloud and A. J. Blackwood, Paper Presented at S.A.E. Meeting, June 2 and 3, 1943.)
376	13967	U.S.A. ...	*Paraffin Hydrocarbons — Correlation of Physical Properties.* (A. W. Francis, Ind. and Eng. Chem., Vol. 35, No. 4, April, 1943, pp. 442-449.)
377	14001	G.B.	*The World's Fuel Resources.* (J. S. Bennett, Engineer, Vol. 176, No. 4,567, 23/7/43, pp. 68-69.)
378	14010	U.S.A. ...	*Colour Index for Light Coloured Petroleum Products.* (I. M. Diller and others, Ind. and Eng. Chem. (Anal. Ed.), Vol. 15, No. 6, 17/6/43, pp. 367-373.)
379	14052	U.S.A. ...	*War Development in the Petroleum Industry.* (E. V. Murphree, Ind. Eng. Chemistry (2nd Edition), Vol. 35, No. 6, June, 1943, pp. 623-631.)
380	14087	Japan ...	*Axis Fuel.* (Flight, Vol. 44, No. 1,810, 2/9/43, p. 256.)
381	14134	Germany ...	*German Motor Fuel and Lubricants Distribution.* (Petroleum Times, Vol. 47, No. 1,202, 21/8/43, pp. 437-438.)
			High Octane and Aviation.
382	13442	G.B.	*The Dixane Process for Producing Aviation Fuel.* (Pet. Times, Vol. 47, No. 1,195, 15/5/43, p. 252.)
383	13470	U.S.A. ...	*Octanes or Centanes After World War II.* (C. M. Larson, Paper Presented at S.A.E. Meeting, June 2 and 3, 1943.)
384	13708	G.B.	*The Performance of Different Fuels.* (J. Spiers, I.A.E. Automobile Research Committee, No. 1943/1.)
385	13740	U.S.A. ...	*The Value of High Octane Fuels.* (R. T. Goodwin, Air Tech., Vol. 3, No. 1, 15/7/43, pp. 40-42, 60.)
386	14051	U.S.A. ...	*Catalytic Hydrogenation Rates, Equipment and Control.* (N. K. Anderson and C. A. Rowe, Ind. Eng. Chemistry, Vol. 35, No. 5, May, 1943, pp. 554-562.)
387	14053	U.S.A. ...	*Cracking Cyclohexane. Thermal and Catalytic Decomposition at High Pressure.* (V. Haensel and V. N. Ipatieff, Ind. Eng. Chemistry (2nd Edition), Vol. 35, No. 6, June, 1943, pp. 632-638.)
388	14096	G.B.	*Leaded Aircraft Fuels.* (Flight, Vol. 44, No. 1,810, 2/9/43, pp. 262-264.)

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389	14144	G.B.	*On the Mechanism of Catalytic Hydrogenation.* (E. K. Rideal, Chemistry and Industry, Vol. 62, No. 36, 4/9/43, pp. 335-338.)
			Gaseous Fuels.
390	13422	G.B.	*Producer Gas Developments in Continental Europe* (Autom. Eng., Vol. 33, No. 436, May, 1943, p. 184.)
391	13430	G.B.	*Gas Conditioning. Cleaning and Cooling Equipment for Producer Gas.* (W. F. Enever, Autom. Eng., Vol. 33, No. 436, May, 1943, pp. 199-202.)
392	13441	G.B.	*Producer Gas After the War.* (Pet. Times, Vol. 47, No. 1,195, 15/5/43, pp. 242-245.)
393	14022	G.B.	*The Gas Industry in the National Economy.* (E. V. Evans, Engineering, Vol. 156, No. 4,044, 16/7/43, pp. 45-47.)
394	14049	U.S.A. ...	*Thermodynamic Properties of Propane.* (W. V. Stearns and E. J. George, Ind. Eng. Chemistry, Vol. 35, No. 5, May, 1943, pp. 602-607.)
395	14050	U.S.A. ...	*Prediction of Unimolecular Gas Phase Reaction Rates.* (F. Daniels, Ind. Eng. Chemistry, Vol. 35, No. 5, May, 1943, p. 504.)
396	14054	U.S.A. ...	*Heat Capacities of Hydrocarbon Gases.* (D. R. Stull and F. D. Mayfield, Ind. Eng. Chemistry (2nd Edition), Vol. 35, No. 6, June, 1943, pp. 639-645.)
397	14075	Germany ...	*The Use of Propane Gas for Heating Purposes in the Laboratory.* (Stahl und Eisen, Vol. 62, No. 45, Nov., 1942, pp. 948-949.) (Engineers' Digest, Vol. 4, No. 6, June, 1943.)
			Oil Testing.
398	13472	U.S.A. ...	*The Pour Point and Pumpability Characteristics of U.S. Army Specification 2-104 A Oils.* (J. C. Geniesse, Paper Presented at S.A.E. Meeting, Jan. 11 and 15, 1943.)
399	13804	G.B.	*Oil Pressure: Effect of Altitude.* (Flight, Vol. 43, No. 1,801, 1/7/43, p. 8.)
400	13829	G.B.	*Oil Aeration and Frothing.* (C. A. Campbell, Flight, Vol. 44, No. 1,805, July, 1943, pp. 116-117.)
401	14047	U.S.A. ...	*Catalysis in the Oxidation of Lubricating Oil.* (R. G. Larsen and F. A. Armfield, Ind. Eng. Chemistry, Vol. 35, No. 5, May, 1943, pp. 581-588.)
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402	13372	U.S.A. ...	*Transportation of Oil—New Wartime Developments.* (National Petroleum News, Vol. 35, No. 26, 30/6/43, pp. 18-19.)
403	13374	Canada ...	*New Canadian Oil Wells.* (National Petroleum News, Vol. 35, No. 25, 23/6/43, p. 24.)
404	13394	G.B.	*Lubrication, Jan.-March,* 1943. (Sci. Lit. Bibliog. Series, No. 593, 1943.)
405	13424	G.B.	*Induction Oil for Heat Treatment.* (Autom. Eng., Vol. 33, No. 436, May, 1943, p. 186.)

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406	13477	U.S.A. ...	*Lubricants for Ordnance Combat and Motor Transport Vehicles.* (R. E. Jeffrey, Paper Presented at S.A.E. Meeting, June 2 and 3, 1943.)
407	13541	G.B.	*Lubrication at Low Rubbing Speeds.* (Mechanical World, Vol. 113, No. 2,944, 4/6/43, p. 607.)
408	13753	G.B.	*Influence of Machine Development on Lubrication (Formation. Actions and Limitations of Boundary Films and Full Fluid Films).* (W. G. G. Godron, Mechanical World, Vol. 114, No. 2,955, 20/8/43, pp. 218-222.)
409	13814	G.B.	*Recovery of Lubricating Oil on a Small Scale.* (Engineer, Vol. 176, No. 4,572, 27/8/43, p. 170.)
410	14135	G.B.	*New Additive for Lubricants (Soyabean Lecithen).* (Petroleum Times, Vol. 47, No. 1,202, 21/8/43, p. 446.)

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(TESTS WITH PLATES, Etc.).

411	13164	U.S.A. ...	*Improving Fatigue Strength of Machine Parts.* (Mechanical Engg., Vol. 65, No. 8, Aug., 1943, pp. 553-563.)
412	13187	G.B.	*Testing Springs for Endurance.* (Mechanical World, Vol. 114, No. 2,953, 6/8/43, pp. 162-167.)
413	13236	U.S.A. ...	*Effect of Screw Threads on Fatigue.* (S. M. Arnold, Mechanical Engg., Vol. 65, No. 7, July, 1943, pp. 497-505.)
415	13332	U.S.A. ...	*Increasing the Fatigue Strength of Machine Parts.* (J. O. Almen, Machinery, Vol. 63, No. 1,609, 12/8/43, p. 176.)
416	13358	G.B.	*Bushed Steel Tubes—Some Causes of Cracking in Structural Members.* (E. J. Raybould and R. J. Pilot, Mechanical World, Vol. 114, No. 2,954, 13/8/43, p. 179.)
417	13364	G.B.	*Calculation of Stress and Deflection of Helical Springs of Rectangular Section.* (Mechanical World, Vol. 114, No. 2,954, 13/8/43, pp. 195-197.)
418	13390	G.B.	*Vibrations of Valves and Valve Springs.* (Sci. Lit. Bibliog. Series, No. 589, 1943.)
419	13481	G.B.	100,000 *Hour Creep Test.* (Mechanical World, Vol. 113, No. 2,942, 21/5/43, pp. 564-565.)
420	13504	G.B.	*Welding Contraction and "Locked-up Stresses."* (Mechanical World, Vol. 113, No. 2,945, 11/6/43, pp. 648-649.)
421	13964	U.S.A. ...	*Stress-Strain Characteristics of Vinyl Elastomers.* (M. C. Reed, Ind. and Eng. Chem., Vol. 35, No. H, April, 1943, pp. 429-431.)
422	14038	Germany ...	*Propagation of Transverse (Bending) Warps in Rods.* (W. Flugge, Z.A.M.M., Vol. 22, No. 6, Dec., 1942, pp. 312-318.)

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423	14039	Germany ...	*Semi-Infinite Space with Hemispherical Load Distribution.* (C. Weber, Z.A.M.M., Vol. 22, No. 6, Dec., 1942, pp. 318-341.)
424	14040	Germany ...	*Stress Peaks in Sheet Metal Provided with Punched Holes.* (A. Hutter, Z.A.M.M., Vol. 22, No. 6, Dec., 1942, pp. 322-325.)
425	14155	U.S.A. ...	*Ring Method for Measuring Elastic Modulii of Wire Specimens.* (A. King, Review of Scientific Instruments, Vol. 14, No. 2, Feb., 1943, p. 33.)
426	14158	U.S.A. ...	*Electrodynamic Determination of the Magnetic Moment of Plates.* (E. T. Benedikt, Review of Scientific Instruments, Vol. 14, No. 2, Feb., 1943, pp. 43-45.)

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864	13347	Japan ...	*New Japanese Rust-Resisting Light Alloy.* (Flight, Vol. 44, No. 1,808, 19/8/43, p. 197.)
427	13448	G.B.	*Production of Magnesium.* (F. C. Thompson, Nature, Vol. 151, No. 3,842, 19/6/43, pp. 692-693.)
428	13502	G.B.	*Forging Aluminium Alloys.* (Mechanical World, Vol. 113, No. 2,945, 11/6/43, p. 646.)
429	13542	G.B.	*Treatment of Wrought Aluminium Alloys.* (Mechanical World, Vol. 113, No. 2,944, 4/6/43, p. 607.)
430	13597	G.B.	*Aluminium—To-morrow.* (Metal Industry, Vol. 63, No. 9, 27/8/43, p. 136.)
431	13600	Germany ...	*Macro Etching of Cast Al.-Cu.-Mg. Alloys in Caustic Soda Solution without Subsequently Removing the Copper Oxide Film.* (E. Kapernick, Metal Industry, Vol. 63, No. 9, 27/8/43, p. 138.)
432	13667	U.S.A. ...	*Drilling Mg. Alloys.* (G. Schlesinger, Mech. Engg., Vol. 65, No. 6, June, 1943, pp. 441-442.)
433	13698	U.S.A. ...	*Aluminium Finned Cylinder Barrel.* (Light Metals, Vol. 6, No. 66, July, 1943, p. 327.)
434	13701	Germany ...	*Light Alloy Gas Cylinders.* (Light Metals, Vol. 6, No. 66, July, 1943, p. 353.)
435	13702	France ...	*The Aluminium Industry in France.* (Light Metals, Vol. 6, No. 66, July, 1943, pp. 354, 358-362.)
436	13723	G.B.	*Magnesium. Its Properties and Characteristics.* (C. H. Desch, Automobile Engineer, Vol. 33, No. 437, June, 1943, pp. 251-253.)
437	13888	G.B.	*Progress in Research and Control (Review of Work on the Extrusion of Aluminium and Aluminium Alloys) (with Comprehensive Bibliography).* (Light Metals, Vol. 6, No. 67, August, 1943, pp. 407-412.)
438	13897	G.B.	*Plastic Working of Magnesium Alloy Sheet.* (Aero. Engg. Review, May, 1943, pp. 21-29.) (Metropolitan Vickers New Bulletin, No. 875, 16/7/43, p. 8.)

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439	14000	G.B.	... ...	*Aluminium in Post-War Reconstruction* (3). (R. Hammond, Engineer, Vol. 176, No. 4,567, 23/7/43, pp. 66-68.)
440	14153	U.S.A.	...	*U.S. Post-War Control of Aluminium and Magnesium.* (Metal Industry, Vol. 63, No. 10, 3/9/43, p. 158.)
				Iron and Steel.
441	13185	G.B.	... ...	*Grain in Steel.* (Mechanical World, Vol. 114, No. 2,953, 6/8/43, pp. 151-153.)
442	13192	G.B.	... ...	*Cold-Rolled Stainless Steel.* (Mechanical World, Vol. 113, No. 2,943, 28/5/43, pp. 590-591.)
443	13479	G.B.	... ...	*Experimental Evidence on the Effect of Composition. Heat Treatment and Other Variable Factors on the Behaviour of Alloy Steel.* (Mechanical World, Vol. 113, No. 2,942, 21/5/43, pp. 545-546.)
444	13687	G.B.	... ...	*Substituting Steel for Brass in the Press Shop (Steel Cartridge Cases).* (Sheet Metal Industries, Vol. 18, No. 196, 30/7/43, pp. 1409-1413.)
445	13844	G.B.	... ...	*Steel Economy in Reinforced Concrete Construction.* (Engineering, Vol. 156, No. 4,050, 27/8/43, p. 172.)
446	13997	U.S.A.	...	*Columbium in High Temperature Steels.* (D. W. Rudorff, J. Am. Soc. Nav. Engs., Vol. 55, No. 1, May, 1943, pp. 380-381.)
447	14099	G.B.	... ...	*The Strain Ageing of Killed New Carbon Steel, with Particular Reference to the Effect of Titanium.* (C. F. Gomstock, Sheet Metal Industries, Vol. 18, No. 197, Sept., 1943, pp. 1527-1534.)
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448	13180	G.B.	... ...	*Use of Bismuth in Fusible Alloys.* (Machinery, Vol. 63, No. 1,606, 22/7/43, p. 103.)
449	13415	G.B.	... ...	*Beryllium Windows for X-Ray Diffraction Tube.* (Z. J. Atlee, General Electric Review, April, 1943, pp. 233-236.) (Abstracted in Met. Vick. Tech. Bull., No. 870, 11/6/43.)
450	13436	G.B.	... ...	*Iridium Alloys.* (Autom. Eng., Vol. 33, No. 436, May, 1943, p. 213.)
451	13609	G.B.	... ...	*Zinc Production in Wartime.* (Trade and Engineering Times, Vol. 53, No. 951, May, 1943, p. 11.)
452	13610	G.B.	... ...	*Titanium Valve in Industry.* (Trade and Engineering Times, Vol. 53, No. 951, May, 1943, p. 28.)
453	13642	G.B.	... ...	*Grain Size in Tin Alloys.* (Sheet Metal Industries, Vol. 17, No. 194, June, 1943, p. 1000.)
454	13839	G.B.	... ...	*The Problem of Copper and Galvanised Iron in the Same Water.* (L. Kenworthy, Engineering, Vol. 156, No. 4,050, 27/8/43, p. 164.)
455	13849	G.B.	... ...	*Free Cutting Nickel Alloy Invar.* (Engineering, Vol. 156, No. 4,050, 27/8/43, p. 180.)
456	13919	G.B.	... ...	*Copper-Antimony-Nickel Gear Alloy.* (Metal Industry, Vol. 63, No. 4, 23/7/43, pp. 50-52.)

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457	13920	G.B.	... ...	*The Effect of Certain Impurities on Copper and Copper Alloys (Contd.).* (S. L. Bailey, Metal Industry, Vol. 63, No. 4, 23/7/43, pp. 53-54.)
458	14112	G.B.	... ...	*Tensile Tests of Arc-Welded Nickel and Monel Metal at Low Temperature.* (O. H. Henry and J. Martinez, Sheet Metal Industries, Vol. 18, No. 197, Sept., 1943, pp. 1611-1613.)
459	14113	G.B.	... ...	*Nichrome Alloys and Their Development.* (Sheet Metal Industries, Vol. 18, No. 197, Sept., 1943, p. 1613.)
460	14146	Germany	...	*Zinc Aluminium Copper Casting Alloys.* (A. Burkhardt and others, Metal Industry, Vol. 63, No. 10, 3/9/43, pp. 146-149.)
461	14147	G.B.	... ...	*The Effect of Certain Elements on the Properties of High Purity Copper.* (S. A. Smart and A. A. Smith, Metal Industry, Vol. 63, No. 10, 3/9/43, pp. 150-153.)
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462	13179	G.B.	... ...	*Spindle Bearings for High Speed Machine Tools (I).* (C. Schlesinger, Machinery, Vol. 63, No. 1,606, 22/7/43, pp. 100-102.)
463	13413	G.B.	... ...	*Distortion in Heat Treatment in Relation to Carbon and Alloy Tool Steels.* (Tech. Bull., May, 1943.) (T. H. Cole, J. Inst. Prod. Engs., Vol. 22, No. 5, May, 1943, pp. 10-18.)
464	13489	G.B.	... ...	*Electric Tool Tipper Development.* (Machinery, Vol. 62, No. 1,597, 20/5/43, pp. 549-552.)
465	13910	G.B.	... ...	*Tool Salvage by Welding.* (Weld. Eng., May, 1943, pp. 35-37.) (L. C. Corham, Metropolitan Vickers Tech. News Bulletin, No. 877, 30/7/43, p. 10.)
				Plastics and Resins.
466	13303	U.S.A.	...	*Nylon in Tyres.* (Scientific American, Vol. 169, No. 2, August, 1943, p. 78.)
467	13357	G.B.	... ...	*Covered Wire Properties of Nylon-Based Covering ("Bicolon").* (Mechanical World, Vol. 114, No. 2,954, 13/8/43, p. 178.)
468	13409	G.B.	... ...	*Plastics and Their Application.* (E. Appleton, Endeavour, Vol. 1, No. 3, July, 1942, pp. 110-113.)
469	13420	G.B.	... ...	*"Bubblfil"—New Shock-Absorbing Material (Air-Filled Cellophane Bubbles).* (Autom. Eng., Vol. 33, No. 436, May, 1943, p. 179.)
470	13483	G.B.	... ...	*Machinery Laminated Phenolic Plastics.* (Machinery, Vol. 62, No. 1,597, 22/5/43, pp. 533-556.)
471	13620	G.B.	... ...	*Sealing Porous Casting with Plastics (New Process).* (V. E. Yarsley, Trade and Engineering Times, Vol. 53, No. 951, May, 1943, p. 44.)
472	13660	G.B.	... ...	*Synthetic Adhesives—Review of Modern Materials and Procedure.* (D. W. Brown, Aircraft Production, Vol. 5, No. 58, Aug., 1942, pp. 395-399.)
473	13900	G.B.	... ...	*Transfer Moulding of Thermosetting Plastics.* (Iron Age, 20/5/43, pp. 47-51.) (C. H. Norris, Metropolitan Vickers News Bulletin, No. 875, 16/7/43, p. 10.)

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474	13908	G.B.	*Thermoplastics as Cable Insulation—I.* (El. Times, 15/7/43, pp. 64-67.) (J. Veit, Metropolitan Vickers Tech. News Bulletin, No. 877, 30/7/43, p. 4.)
475	13911	G.B.	*Recent Developments in Organic Plastics for Electrical Insulation.* (El. Engg., May, 1943, pp. 191-197.) (T. Hazen, Metropolitan Vickers Tech. News Bulletin, No. 876, 23/7/43, p. 3.)
476	13969	U.S.A. ...	*Effect of Acetylation on Water-Binding Properties of Cellulose.* (J. C. Bletzinger, Ind. and Eng. Chem., Vol. 35, No. 4, April, 1943, pp. 474-480.)
477	13977	U.S.A. ...	*New Synthetic Plastic—Polectron— to Replace Mica.* (Sci. Am., Vol. 169, No. 1, July, 1943, pp. 11-12.)
478	13981	U.S.A. ...	*Molecular Attractions—The Essential Difference Between Fibres, Plastics and Elastomers.* (Sci. Am., Vol. 169, No. 1, July, 1943, p. 17.)
479	13982	U.S.A. ...	*Flexible Tubing Made of Plastics.* (Sci. Am., Vol. 169, No. 1, July, 1943, p. 28.)
480	13995	U.S.A. ...	*Cellophane Bubbles—"Bubblfil."* (J. Am. Soc. Nav. Engs., Vol. 55, No. 2, May, 1943, pp. 373-374.)
481	14078	Germany ...	*Thermal Expansion of Laminated Plastics.* (Kunststoffe, Vol. 32, No. 10, Oct., 1942, pp. 295-297.) (R. Vieweg and W. Schneider, Engineers' Digest, Vol. 4, No. 6, June, 1943, pp. 184-185.)
			Rubber (Nat. and Syn.).
482	13270	G.B.	*Rubber Dies for Small Presses.* (A. Bernard, Aircraft Production, Vol. 5, No. 59, Sept., 1943, pp. 415-417.)
483	13300	U.S.A. ...	*New Rubber-like Material—"Nitcogum." Bomb Casings Made Faster with Induction Heating.* (Scientific American, Vol. 169, No. 2, Aug., 1943, p. 60.)
484	13371	Canada ...	*Canadian Buna—S. Plant.* (National Petroleum News, Vol. 35, No. 26, 30/6/43, p. 16.)
485	13373	U.S.A. ...	*Synthetic Rubber. Information Circular No.* 7,242. *(Issued by U.S. Bureau of Mines.)* (National Petroleum News, Vol. 35, No. 25, 23/6/43, p. 10.)
486	13432	G.B.	*Synthetic Rubbers.* (S. S. Pickles, Autom. Eng., Vol. 33, No. 436, May, 1943, pp. 201-202.)
487	13447	G.B.	*Natural and Synthetic High Polymers (Text-Book).* (K. H. Myer, Nature, Vol. 151, No. 3,842, 19/6/43, pp. 682-683.)
488	13482	G.B.	*Synthetic and Reclaimed Rubber.* (Mechanical World, Vol. 113, No. 2,942, 21/5/43, pp. 566-567.)
489	13488	G.B.	*Cutting Sponge Rubber and Other Resilient Materials.* (Machinery, Vol. 62, No. 1,597, 20/5/43, p. 548.)
490	13664	U.S.A. ...	*Synthetic Rubber.* (L. F. Marek, Mech. Engg., Vol. 65, No. 6, June, 1943, pp. 412-416.)
491	13915	G.B.	*The Physical States of Rubber in Relation to its Molecular Structure.* (L. R. G. Treloar, Chemistry and Industry, Vol. 62, No. 35, 28/8/43, pp. 326-328.)

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492	13971	U.S.A. ...	*Brittle Temperature of Rubber Under Variable Stress.* (A. K. Kemps and others, Ind. and Eng. Chem., Vol. 35, No. 4, April, 1943, p. 488.)
493	13978	U.S.A. ...	*New Synthetic Rubber-like Material "Paracon."* (Sci. Am., Vol. 169, No. 1, July, 1943, p. 13.)
494	14133	G.B.	*Synthetic Rubber Used for Oil Storage Tanks.* (Petroleum Times, Vol. 47, No. 1,202, 21/8/43, p. 430.)
			Wood and Plywood.
495	13231	G.B.	*Plywood and Plastic—III.* (W. Nichols, Flight, Vol. 44, No. 1,806, August 5, 1943, pp. 150-154.)
496	13238	U.S.A. ...	*Plastic Developments from Redwood.* (H. F. Lewis, Mechanical Engg., Vol. 65, No. 7, July, 1943, pp. 515-517.)
497	13378	G.B.	*Plywood and Plastics—IV.* (W. Nichols, Flight, Vol. 44, No. 1,807, 12/8/43, pp. 174-175.)
498	13396	G.B.	*Timbers of the New World.* (*Book, publ. by Yale University Press*, 1943.) (Nature, Vol. 152, No. 3,849, 7/8/43, pp. 144-145.)
499	13496	G.B.	*Plywood Containers.* (Nature, Vol. 151, No. 3,843, 26/6/43, pp. 731-732.)
500	13497	G.B.	*Some British Empire Timbers.* (Nature, Vol. 151, No. 3,843, 26/6/43, p. 732.)
501	13655	G.B.	*Ash Bark Beetle Damage.* (Aircraft Production, Vol. 5, No. 58, Aug., 1942, p. 375.)
502	13665	U.S.A. ...	*Flexible Pressure in Veneer and Plywood Work.* (T. D. Perry, Mech. Engg., Vol. 65, No. 6, June, 1943, pp. 417-421.)
503	13833	G.B.	*Plywood and Plastics—II.* (W. Nichols, Flight, Vol. 44, No. 1,805, July, 1943, pp. 119-122.)
504	13846	G.B.	*Hydraulic Jet Machine for Removing Bark from Timber.* (Engineering, Vol. 156, No. 4,050, 27/8/43, p. 175.)
			Diamonds, Glass, Ceramics.
505	13171	U.S.A. ...	*New Type of Wrench Made of Plastic (Plexiglas).* (Mechanical Engg., Vol. 65, No. 8, August, 1943, p. 592.)
506	13178	G.B.	*Transparent Template Gauges.* (Machinery, Vol. 63, No. 1,606, 22/7/43, p. 97.)
507	13298	U.S.A. ...	*New Optical Glass Free of Sand.* (Scientific American, Vol. 169, No. 2, Aug., 1943, p. 59.)
508	13397	G.B.	*Artificial Production of Diamonds.* (C. H. Desch, Nature, Vol. 152, No. 3,849, 7/8/43, pp. 148-149.)
509	13429	G.B.	*Glass-Covered Cores for Castings.* (Autom. Eng., Vol. 33, No. 436, May, 1943, p. 198.)
510	13538	G.B.	*Standards for Diamond-Tipped Boring Tools (B.S.S. 1,120).* (Machinery, Vol. 63, No. 1,603, 1/7/43, p. 28.)
511	13611	G.B.	*Synthetic Sapphires.* (Trade and Engineering Times, Vol. 53, No. 951, May, 1943, p. 28.)
512	13666	U.S.A. ...	*Glass for Precision Gauging.* (H. B. Hambleton, Mech. Engg., Vol. 65, No. 6, June, 1943, pp. 435-437.)

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513	13672	U.S.A. ...	*Asbestos Cement Conduit (Requires no Critical Materials).* (Mech. Engg., Vol. 65, No. 6, June, 1943, p. 21.)
514	13703	G.B. ...	*Synthetic Gems for Instrument Bearings.* (Light Metals, Vol. 6, No. 66, July, 1943, p. 354.)
515	13752	G.B. ...	*"Hysil" Glass for Workshop Gauges.* (Mechanical World, Vol. 114, No. 2,955, 20/8/43, p. 217.)
516	13820	G.B. ...	*Sandless Optical Glass.* (Engineer, Vol. 176, No. 4,572, 27/8/43, p. 177.)
517	14088	Germany	*German Use of Porcelain as a Substitute for Metal.* (Flight, Vol. 44, No. 1,810, 2/9/43, p. 256.)
518	14143	G.B. ...	*Ceramics—Recent Developments.* (Engineer, Vol. 176, No. 4,573, 3/9/43, p. 187.)
			Paints, Enamels, Pitches.
519	13403	G.B. ...	*Development and Use of Luminescent Substances.* (L. Levy and D. W. West, Endeavour, Vol. 2, No. 5, Jan., 1943, pp. 22-24.)
520	13866	U.S.A.	*Viscosity of Pitches and Coal Tar Residues.* (Ind. Engg. and Chemistry, Vol. 15, No. 4, 15/4/43, pp. 235-242.)
521	13965	U.S.A.	*Anti-Fouling Paints—Test Procedures and General Observations.* (G. H. Young and others, Ind. and Eng. Chem., Vol. 35, No. 4, April, 1943, pp. 432-436.)
522	13966	U.S.A.	*Heavy Metal Compounds as Toxic Agents in Anti-Fouling Paints.* (G. H. Young and W. K. Schneider, Ind. and Eng. Chem., Vol. 35, No. 4, April, 1943, pp. 436-438.)
523	13970	U.S.A.	*Asphalt-Polybutene Paints.* (H. C. Evans and others, Ind. and Eng. Chem., Vol. 35, No. 4, April, 1943, p. 481.)
524	14048	U.S.A.	*Durability of Lustreless Enamels.* (S. E. Beck, Ind. and Eng. Chemistry, Vol. 35, No. 5, May, 1943, pp. 594-595.)
525	14160	U.S.A.	*New Metallographic Polishing Material ("Gamel").* (Review of Scientific Instruments, Vol. 14, No. 2, Feb., 1943, p. 55.)
			Corrosion.
526	13289	G.B. ...	*The Corrosion of Metals in Air.* (W. H. J. Vernon, Chemistry and Industry, Vol. 62, No. 34, 21/8/43, pp. 314-318.)
527	13697	Germany	*Stress Corrosion Phenomena in Aluminium Magnesium Alloys.* (Review of German Paper in Aluminium, 1942, Vol. 24, p. 129.) (G. Sietel and Vosskühler, Light Metals, Vol. 6, No. 66, July, 1943, pp. 323-326.)
528	14150	G.B. ...	*Corrosion of Cadium Coatings.* (G. Soderberg, Metal Industry, Vol. 63, No. 10, 3/9/43, pp 155-156.)
			B. Fabrication.
			Welding.
529	13297	U.S.A.	*New Glue "Welding" Process.* (Scientific American, Vol. 169, No. 2, Aug., 1943, pp. 58-59.)

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530	13546	G.B.	*Sheet Metal Seam Welding.* (Mechanical World, Vol. 113, No. 2,944, 4/6/43, p. 619.)
531	13647	G.B.	*Control of Electrode Tip Diameter, a New Formula for Spot Welding.* (N. A. Tucker, Sheet Metal Industries, Vol. 17, No. 194, June, 1943, pp. 1043-1051, 1066.)
532	13648	G.B.	*Deep Penetration Butt Welding and Semi-Automatic Welder.* (Sheet Metal Industries, Vol. 17, No. 194, June, 1943, p. 1054.)
533	13690	G.B.	*Welding of Light Alloys.* (Sheet Metal Industries, Vol. 18, No. 196, 30/7/43, pp. 1421-1425.)
534	13693	G.B.	*Weld Finishing.* (E. G. West, Sheet Metal Industries, Vol. 18, No. 196, 30/7/43, pp. 1433-1436.)
535	13713	G.B.	*Welding.* (I.A.E. Automobile Research Committee, No. 1,943-1,948.)
536	13750	G.B.	*Care of Oxy-Acetylene Welding Equipment.* (Mechanical World, Vol. 114, No. 1,955, 20/8/43, p. 215.)
537	13901	G.B.	*Second Interim Report of the R. 52 Sub-Committee on the Spot Welding of Light Alloys.* (Inst. of Weld. Trans., April, 1943, pp. 49-68.) (Metropolitan Vickers News Bulletin, No. 875, 16/7/43, p. 10.)
538	13909	G.B.	*Resistance Welding Below the Frost Line.* (Weld. J., May, 1943, pp. 339-342.) (A. L. Munson, Metropolitan Vickers News Bulletin, No. 877, 30/7/43, p. 9.)
539	13987	U.S.A. ...	*Refrigerator Welding—New Development.* (Sci. Am., Vol. 169, No. 1, July, 1943, pp. 38-39.)
540	14080	Switzerland ...	*Welding Sets of Instantaneous Reaction Type for D.C. Arc Welding.* (Brown Boveri Review, Vol. 29, No. 4, April, 1942, pp. 100-105.) (H. Kocher, Engineers' Digest, Vol. 4, No. 6, June, 1943, pp. 188-190.)
541	14110	G.B.	*Annual Report of Institute of Welding.* (Sheet Metal Industries, Vol. 18, No. 197, Sept., 1943, pp. 1605-1608.)
542	14111	G.B.	*Some Definitions of Terms Used in Modern Welding Processes.* (A. J. T. Eyles, Sheet Metal Industries, Vol. 18, No. 197, Sept., 1943, pp. 1609-1610.)
543	14152	G.B.	*Fusion Welding of Wrought Aluminium Alloys (Published by Wrought Light Alloys Development Association).* (Metal Industry, Vol. 63, No. 10, 3/9/43, p. 158.)
			Soldering and Brazing.
544	13506	G.B.	*Sifbronzing, Welding or Brazing?* (Mechanical World, Vol. 113, No. 2,945, 11/6/43, p. 653.)
545	13545	G.B.	*Brazing Aluminium Alloys.* (Mechanical World, Vol. 113, No. 2,944, 4/6/43, pp. 618-619.)
546	13674	U.S.A. ...	*Brazing with Phos. Copper.* (Mech. Engg., Vol. 65, No. 6, June, 1943, pp. 35-36.)
547	13699	U.S.A. ...	*Furnace and Dip Brazing of Light Alloys as Developed in the U.S.A.* (Light Metals, Vol. 6, No. 66, July, 1943, pp. 336-349.)

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548	13704	G.B.	... ...	*Fluxes Used in Soft Soldering.* (Siemen's Mag. Eng. Supple., No. 206, Aug.-Sept., 1942.)
549	13898	G.B.	... ...	*Soldering Aluminium Alloys.* (Iron Age, 27/5/43, pp. 52-57.) (Metropolitan Vickers News Bulletin, No. 875, 16/7/43, p. 9.)
550	14104	G.B.	... ...	*Soldering of Crystal Units in Radio Equipment by High Frequency Induction Heat.* (Sheet Metal Industries, Vol. 18, No. 197, Sept., 1943, p. 1553.)
551	14115	G.B.	... ...	*Brazing Technique with Relatively Low Melting Point Alloys.* (Sheet Metal Industries, Vol. 18, No. 197, Sept., 1943, p. 1600.)
552	14137	G.B.	... ...	*New Soldering Iron Design.* (Wireless World, Vol. 49, No. 8, Aug., 1943, p. 229.)
				Heat Treatment and Foundries.
553	12695	Germany	...	*Low Beryllium-Platinum Foundries.* (Z.V.D.I., 1942, Vol. 86, p. 612.) (K. W. Fröhlich, Light Metals, Vol. 6, No. 66, July, 1943, p. 318.)
554	13197	G.B.	... ...	*Heat Treating Light Alloys.* (J. F. Kayser, Light Metals, Vol. 6, No. 65, June, 1943, p. 273.)
555	13198	G.B.	... ...	*Better Foundry Methods (Reprint of Papers Published in Iron Age).* (Light Metals, Vol. 6, No. 65, June, 1943, p. 296.)
556	13547	G.B.	... ...	*A Furnace Insulation Analyser.* (Mechanical World, Vol. 113, No. 2,944, 4/6/43, pp. 620-622.)
557	13599	G.B.	... ...	*Self-Cleaning Heat-Treat Nozzle (in Portable Quenching Cabinet).* (Metal Industry, Vol. 63, No. 9, 27/8/43, p. 138.)
558	13601	G.B.	... ...	*Metallurgical Factors in the Founding of Aluminium Alloys (Concluded).* (S. A. E. Wells, Metal Industry, Vol. 63, No. 9, 27/8/43, pp. 139-140.)
559	13646	G.B.	... ...	*Application of Radiant Heat to Metal Finishing.* (J. A. Nelson and H. Silman, Sheet Metal Industries, Vol. 17, No. 194, June, 1943, pp. 1039-1048.)
560	13661	G.B.	... ...	*High Frequency Heating.* (Aircraft Production, Vol. 5, No. 58, August, 1942, pp. 402-404.)
561	13686	G.B.	... ...	*Theory and Practice of the Application of Radiant Heat to Metal Finishing.* (J. H. Nelson and H. Silman, Sheet Metal Industries, Vol. 18, No. 196, 30/7/43, pp. 1393-1402, 1417.)
562	13694	G.B.	... ...	*Control in Aluminium Foundries.* (Light Metals, Vol. 6, No. 66, July, 1943, pp. 315-318.)
563	14108	G.B.	... ...	*Application of Radiant Heat to Metal Finishing.* (J. H. Nelson and H. Silman, Sheet Metal Industries, Vol. 18, No. 197, Sept., 1943, pp. 1579-1582.)
564	14114	Germany	...	*Advantages and Limits of the Processes Used in Finishing Heat Treatment of Welds.* (Die Wärme, Vol. 65, No. 21-22, 1942, pp. 196-200.) (W. Zimm, Sheet Metal Industries, Vol. 18, No. 197, Sept., 1943, pp. 1614-1620.)
				Surface Treatment.
565	13173	U.S.A.	...	*Plating Extends Tool Life.* (Mechanical Engg., Vol. 65, No. 8, August, 1943, p. 28.)

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566	13196	U.S.S.R. ...	*Electro-Deposition of Light Metals from Non-Aqueous Solutions.* (M. A. Klochko, Light Metals, Vol. 6, No. 65, June, 1943, pp. 269-272.)
567	13417	G.B.	*Recent Developments in Zinc Plating.* (M. B. Diggin, Met. Finishing, May, 1943, pp. 277-281.) (Abstracted in Met. Vick. Tech. Bull., No. 874, 9/7/43.)
568	13418	G.B.	*Surface Protection of Magnesium.* (S. H. Barmasel, Iron Age, 22/4/43, pp. 44A-44D.) (Abstracted in Met. Vick. Tech. Bull., No. 874, 9/7/43.)
569	13419	G.B.	*Plating on Aluminium (Krome-Alume Process).* (R. F. Yates, Metals and Alloys, Dec., 1942, pp. 1084-1088.) (Abstracted in Met. Vick. Tech. Bull., No. 874, 9/7/43.)
570	13428	G.B.	*Rustproof Coatings.* (H. Silman, Autom. Eng., Vol. 33, No. 436, May, 1943, pp. 195-198.)
571	13438	G.B.	*Liquid Nitriding.* (Iron Age, 15/4/43, pp. 41-45.) (Abstracted in Met. Vick. Tech. Bull., No. 871, 18/6/43.)
572	13468	U.S.A. ...	*Shot Blasting to Increase Fatigue Resistance.* (J. O. Almen, Paper Presented at S.A.E. Meeting, June 9-10, 1943.)
573	13532	G.B.	*Hard Chromium Plating for Prolonging Life of Cutting Tools and Dies.* (Machinery, Vol. 63, No. 1,603, 1/7/43, p. 7.)
574	13644	G.B.	*Phosphate Coatings as Aids in the Plastic Working of Metals.* (A. Durer and others (R.T.P.3 Translation No. 1,748), Sheet Metal Industries, Vol. 17, No. 194, June, 1943, pp. 1025-1027.)
575	13700	G.B.	*R.A.E. Chromate Treatment.* (Light Metals, Vol. 6, No. 66, July, 1943, p. 353.)
576	13746	G.B.	*Preventing Joints from Sticking. Effect of Graphite Coatings.* (Mechanical World, Vol. 114, No. 2,955, 20/8/43, p. 209.)
577	13842	G.B.	*Protective Painting of Submerged Steel.* (Engineering, Vol. 156, No. 4,050, 27/8/43, pp. 167-168.)
578	13895	G.B.	*Automatic Plating.* (El. Rev., 2/7/43, pp. 3-8.) (Metropolitan Vickers News Bulletin, No. 875, 16/7/43, p. 6.)
579	13923	G.B.	*Filtration of Plating Solutions.* (R. C. Green, Metal Industry, Vol. 63, No. 4, 23/7/43, pp. 58-59.)
580	13985	U.S.A. ...	*Potassium Cyanide Speeds up Plating of Silver Bearings.* (Sci. Am., Vol. 169, No. 1, July, 1943, p. 32.)
581	13986	U.S.A. ...	*Corrosion Proof Coatings for Ferrous Metal Surfaces ("Silco" and Armor-Vit).* (Sci. Am., Vol. 169, No. 1, July, 1943, pp. 37-38.)
582	14149	G.B.	*Determining Thickness of Metallic Coatings.* (W. B. Stoddard, Metal Industry, Vol. 63, No. 10, 3/9/43, pp. 154-155.)

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			Casting.
583	13195	G.B.	*Principles of Magnesium Alloy Founding* (*Casting Practices*). (Light Metals, Vol. 6, No. 65, June, 1943, pp. 262-268.)
584	13329	G.B.	*Die Casting Supplement—Spines, Runners and Gates of Die Casting Dies.* (Machinery, Vol. 63, No. 1,607, 29/7/43, pp. 134-136.)
585	13361	G.B.	*Composite Castings.* (Mechanical World, Vol. 114, No. 2,954, 13/8/43, p. 187.)
586	13369	G.B.	*Continuous Production of Manganese Steel Castings from the Tropenas Converter.* (L. W. Bolton and J. Hill, Engineering, Vol. 156, No. 4,049, 20/8/43, pp. 158-160.)
587	13503	G.B.	*Straightening Magnesium Castings.* (Mechanical World, Vol. 113, No. 2,945, 11/6/43, p. 647.)
588	13596	G.B.	*Reclamation of Porous Castings.* (Metal Industry, Vol. 63, No. 9, 27/8/43, p. 136.)
589	13731	G.B.	*Relieving Strains in Castings.* (Machinery, Vol. 63, No. 1,610, 19/8/43, p. 213.)
590	13745	G.B.	*Centrifugal Casting of White Metal.* (Mechanical World, Vol. 114, No. 2,955, 20/8/43, pp. 208-209.)
591	13847	G.B.	*Continuous Production of Manganese Steel Castings from Tropenas Converter.* (L. W. Bolton and J. Hill, Engineering, Vol. 156, No. 4,050, 27/8/43, pp. 177-178.)
592	13921	G.B.	*Rapid Tempering of Castings.* (Metal Industry, Vol. 63, No. 4, 23/7/43, p. 54.)
593	14148	G.B.	*Aluminium Casting Technique.* (Metal Industry, Vol. 63, No. 10, 3/9/43, p. 153.)
			Flame and Gas Cutting.
594	13435	G.B.	*Flame Cutting.* (Autom. Eng., Vol. 33, No. 436, May, 1943, pp. 211-213.)
595	13914	G.B.	*The Gas-Cutting Process and its Effects on Steel—I.* (Metallurgia, June, 1943, pp. 73-76.) (T. J. Palmer, Metropolitan Vickers Tech. News Bulletin, No. 876, 23/7/43, p. 9.)
			Drawing and Rolling.
596	13679	G.B.	*Rolling, Processing and Testing of Tinplate.* (W. E. Hoare and E. S. Hedges, Sheet Metal Industries, Vol. 18, No. 196, 30/7/43, pp. 1343-1347.)
597	13681	Germany ...	*Cold and Hot Rolling of Metals.* (O. Emicke and K. H. Lucas, Sheet Metal Industries, Vol. 18, No. 196, 30/7/43, pp. 1355-1360.)
598	13683	G.B.	*Two-Stage Drawing of Cylindrical Cups.* (H. W. Swift, Sheet Metal Industries, Vol. 18, No. 196, 30/7/43, pp. 1365-1379.)
599	13689	Germany ...	*Power Requirements for Hot Rolling Clad Metals* (*Abstract of German Paper*). (A. Pomp and W. Lueg, Sheet Metal Industries, Vol. 18, No. 196, 30/7/43, p. 1418.)
600	13709	G.B.	*Deep Drawing Research.* (J. C. Cooper and H. W. Swift, I.A.E. Automobile Research Committee, No. 1,943-2.)

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601	13710	G.B.	... ...	*Deep Drawing Research.* (E. Baildon, I.A.E. Automobile Research Committee, No. 1,943-3.)
				Milling, Grinding, Machining.
602	13331	G.B.	... ...	*Heavy Duty Milling Operations on High Tensile Hiduminium.* (Machinery, Vol. 63, No. 1,609, 12/8/43, pp. 173-175.)
603	13427	G.B.	... ...	*Precision Grinding.* (Autom. Eng., Vol. 33, No. 436, May, 1943, pp. 191-194.)
604	13487	G.B.	... ...	*The Influence of Work Piece Height Position in Centreless Grinding.* (P. Grodzinsky, Machinery, Vol. 62, No. 1,597, 20/5/43, pp. 546-548.)
605	13598	G.B.	... ...	*Machining Copper and its Alloys—III. (Thread Chasers, Milling Cutters, Lubricants and Coslants.)* (Metal Industry, Vol. 63, No. 9, 27/8/43, pp. 137-138.)
606	13716	G.B.	... ...	*Precision Grinding.* (Automobile Engineer, Vol. 33, No. 437, June, 1943, pp. 229-234.)
				Powder Metallurgy.
607	13234	U.S.A.	...	*Powder Metallurgy. Physical Properties of the Parts Made from Iron Powder.* (F. V. Lenel, Mechanical Engg., Vol. 65, No. 7, July, 1943, pp. 489-492.)
608	13595	G.B.	... ...	*Formation of Aluminium and Aluminium Alloys by Powder Metallurgy.* (G. D. Cremer and J. J. Cordiano, Metal Industry, Vol. 63, No. 9, 27/8/43, pp. 132-135.)
609	13983	U.S.A.	...	*Powder Metallurgy.* (Sci. Am., Vol. 169, No. 1, July, 1943, pp. 29-30.)
				C. Inspection.
				X-Ray, Spectrographic Examination.
610	13190	G.B.	... ...	*Metal Surfaces Under the Scanning Electron Microscope.* (Mechanical World, Vol. 113, No. 2,943, 28/5/43, pp. 576-580.)
611	13408	G.B.	... ...	*Textile Fibres Under the X-Ray.* (W. Y. Astbury, Endeavour, Vol. 1, No. 2, April, 1942, pp. 70-73.)
612	13416	G.B.	... ...	*Radiography of Spot Welds.* (R. C. Woods and others, Metals and Alloys, Sept., 1942, pp. 443-447.) (Abstracted in Met. Vick. Tech. Bull., No. 874, 9/7/43.)
613	13508	G.B.	... ...	*Gamma Ray Examination of Materials.* (C. Croxon, Met. Vick. Tech. News Bull., No. 866, 14/5/43, p. 2.)
614	13540	G.B.	... ...	*Flaws in Casting: Detection by Gamma Rays.* (Mechanical World, Vol. 113, No. 2,944, 4/6/43, p. 606.)
615	13722	G.B.	... ...	*Electro-Magnetic Crack Detection.* (Automobile Engineer, Vol. 33, No. 437, June, 1943, pp. 247-248.)
616	13992	U.S.A.	...	*A Review of Spectrographic Analysis of Some Metals and Alloys.* (J. Sherman and J. W. Jenkins, J. Am. Soc. Nav. Engs., Vol. 55, No. 2, May, 1943, pp. 189-312.)

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617	14003	G.B.	*The Spectrographic Analysis of Cast Iron.* (F. B. Ling and others, Engineer, Vol. 176, No. 4,567, 23/7/43, pp. 76-78.)
			Mechanical Testing.
618	13189	G.B.	*The End Quench Test.* (J. Winning, Mechanical World, Vol. 113, No. 2,943, 28/5/43, pp. 573-575.)
619	13407	G.B.	*The Significance of Metal Single Crystals.* (E. N. da C. Andrade, Endeavour, Vol. 1, No. 2, April, 1942, pp. 64-66.)
620	13688	G.B.	*Identifying "Mixed" White Metals.* (Sheet Metal Industries, Vol. 18, No. 196, 30/7/43, p. 1414.)
621	14011	U.S.A. ...	*Determination of Small Amounts of Tellurium in High Lead and Tin-Base Alloys.* (R. A. Schaefer, Ind. and Eng. Chem. (Anal. Ed.), Vol. 15, No. 6, 17/6/43, p. 379.)
622	14012	U.S.A. ...	*Determination of Iron in the Presence of Chromium and Titanium with the Jones Reductor.* (F. S. Grimaldi and others, Ind. and Eng. Chem. (Anal Ed.), Vol. 15, No. 6, 17/6/43, pp. 387-388.)
			Quality Control.
623	13181	G.B.	*Quality Control in True Perspective.* (Machinery, Vol. 63, No. 1,606, 22/7/43, pp. 103-104.)
624	13442	G.B.	*Quality Control in Operation.* (Prod. and Eng. Bull., Vol. 2, No. 8, June-July, 1943, p. 374.)
625	13749	G.B.	*Problem of Inspection.* (Mechanical World, Vol. 114, No. 2,955, 20/8/43, p. 214.)
			INSTRUMENTS.
			Aircraft.
626	13739	U.S.A. ...	*The Gyropilot — Operating Principles.* (D. P. Kelley, Air Tech., Vol. 3, No. 1, 15/7/43, pp. 34-38.)
			Electrical, Magnetic.
627	13266	U.S.A. ...	*Electrical Method for Studying Oil Film Thickness.* (Automotive Industries, Vol. 89, No. 1, 1/7/43, pp. 44, 80.)
628	13305	U.S.A. ...	*Electric Motor Control Regulator. Speed Through Use of Electronic Tubes.* (Scientific American, Vol. 169, No. 2, August, 1943, pp. 82-83.)
629	13406	G.B.	*The Cyclotron (Electro-Magnet).* (F. Fairbrother, Endeavour, Vol. 1, No. 1, Jan., 1943, pp. 40-41.)
630	13603	G.B.	*A Photo-Electric Polarimeter.* (E. J. B. Willey, J. of Scientific Instruments, Vol. 20, No. 5, May, 1943, pp. 74-75.)
631	13634	G.B.	*Electric Shell-Exploding Device (Patent).* (Aeronautics, Vol. 8, No. 6, July, 1943, p. 63.)
632	13707	G.B.	*The Magnetization of Permanent Magnets for Polarized Apparatus.* (Siemen's Mag. Eng. Supple., No. 209, Feb.-Mar., 1943.)
633	13816	G.B.	*Electric Cable Fault Locator and Vulcaniser.* (Engineer, Vol. 176, No. 4,572, 27/8/43, pp. 173-174.)
634	13922	G.B.	*An Electrical Contact Testing Machine.* (Metal Industry, Vol. 63, No. 4, 23/7/43, pp. 55-57.)

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			Spectrographic, Electronic, etc.
635	13306	U.S.A. ...	*Continuous Flow Colorimeter.* (Scientific American, Vol. 169, No. 2, August, 1943, pp. 85-86.)
636	13492	G.B. ...	... *Electron Microscopic Examination.* (Nature, Vol. 151, No. 3,843, 26/6/43, pp. 725-726.)
637	13867	U.S.A.	... *Modification of Ceneo Spectrophotometer (Permitting Measurements of Reflection and Fluorescence Spectra).* (H. J. Dutton and G. F. Bailey, Ind. and Eng. Chemistry, Vol. 15, 15/4/43, pp. 275-277.)
638	13968	U.S.A.	... *Electron Microscopy in Chemistry.* (V. K. Zwarzkin, Ind. and Eng. Chem., Vol. 35, No. 4, April, 1943, pp. 450-458.)
639	14154	U.S.A.	... *Voltage Stabilizer for Electron Diffraction Power Supply.* (S. H. Bauer, Review of Scientific Instruments, Vol. 14, No. 2, Feb., 1943, pp. 30-32.)
640	14156	U.S.A.	... *Note on a Method for Measuring Small Electric Charges (Apparatus Designed to Measure Ionization Produced in Air by Roentgenographic Apparatus).* (R. M. Showers, Review of Scientific Instruments, Vol. 14, No. 2, Feb., 1943, pp. 35-37.)
641	14157	U.S.A.	... *The Measurement of Anomalous Dispersion in Opaque Dielectrics (Index of Refraction of Opaque Materials Determined as a Function of Wave Length).* (A. W. Lawson, Review of Scientific Instruments, Vol. 14, No. 2, Feb., 1943, pp. 38-42.)
			Stress-Strain Gauges.
643	13404	G.B. ...	... *Surface Tension and its Measurement.* (A. Ferguson, Endeavour, Vol. 2, No. 5, Jan., 1943, pp. 34-38.)
644	13894	G.B. ...	... *A Tension-Compression Device for Quantitative X-Ray Diffraction Evaluation of Strain in Metals and a Calibrated Series of Aluminium Alloys.* (J. App. Phys., June, 1943, pp. 284-290.) (G. L. Clark, Metropolitan Vickers News Bulletin, No. 875, 16/7/43, p. 1.)
			Automatic, Mechanical.
645	13399	G.B. ...	... *Testing and Rating Air Filters.* (Nature, Vol. 152, No. 3,849, 7/8/43, p. 167.)
646	13605	G.B. ...	... *A Simple Construction of Accurate Division Plates (for Gear Cutting, Scale Dividing, etc.).* (D. C. Gall, J. of Scientific Instruments, Vol. 20, No. 5, May, 1943, p. 77.)
647	13788	Germany	... *German Mechanical Instruments of Precision.* (C. Neumann, Germany and You, Vol. 13, No. 6, June 15, 1943, pp. 167-169.)

ITEM NO.	R.T.P. REF.		TITLE AND JOURNAL.
648	13869	U.S.A. ...	*Automatic Apparatus for Determination of Small Concentrations of Sulphur Dioxide in Air.* (M. D. Thomas and others, Ind. and Eng. Chemistry, Vol. 15, No. 4, 15/4/43, pp. 287-290.)
649	14014	U.S.A. ...	*Reproducibility of Weighings Made on Microchemical Balances.* (C. J. Bodden, Ind. and Eng. Chem. (Anal. Ed.), Vol. 15, No. 6, 17/6/43, pp. 415-416.)

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650	12922	G.B.	*Method of Measuring Waste Steam.* (Engineer, Vol. 176, No. 4,571, 20/8/43, pp. 153-154.)
651	13177	G.B.	*Gauge Design and Dimensioning.* (Machinery, Vol. 63, No. 1,606, 22/7/43, pp. 92-97.)
652	13193	G.B.	*The Measurement of Thickness.* (Mechanical World, Vol. 113, No. 2,943, 28/5/43, pp. 592-593.)
653	13357	G.B.	*The Measurement of Waste Steam.* (Engineering, Vol. 156, No. 4,049, 20/8/43, p. 155.)
654	13607	G.B.	*Ambient Temperature Recorder.* (J. of Scientific Instruments, Vol. 20, No. 5, May, 1943, pp. 81-82.)
655	13878	U.S.A. ...	*Accurate Low-Pressure Gauge.* (F. E. E. Germann and K. A. Gagos, Ind. and Eng. Chemistry, Vol. 15, No. 4, 15/4/43, pp. 285-286.)
656	14159	U.S.A. ..	*A Method of Increasing the Sensitivity of Bourdon Gauges.* (S. Barnartt and J. B. Ferguson, Review of Scientific Instruments, Vol. 14, No. 2, February, 1943, pp. 46-47.)

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Organisation and Control.

657	13257	G.B.	*Some Post-War Industrial Problems.* (A. P. M. Fleming, J. of the Inst. of Production Eng., Vol. 22, No. 7, July, 1943, pp. 231-249.)
658	13312	G.B.	*Balanced Aircraft Production (10th Report of Select Committee on National Expenditure).* (Flight, Vol. 44, No. 1,809, 26/8/43, pp. 223-225.)
659	13337	G.B.	*Organising a Production Suggestions Scheme.* (Machinery, Vol. 63, No. 1,609, 12/8/43, pp. 186-187.)
660	13411	G.B.	*Production Control.* (R. Appleby, J. Inst. Prod. Engs., Vol. 22, No. 5, May, 1943, pp. 179-210.)
661	13444	G.B.	*The Fundamentals of Efficient Production Control.* (Prod. and Eng. Times, Vol. 2, No. 8, June-July, 1942, pp. 367-370.)
662	13515	G.B.	*A Verdict on Aircraft Production (Report of Selection Committee).* (Aeroplane, Vol. 65, No. 1,683, 27/8/43, pp. 232-233.)
663	13534	G.B.	*Recent Developments in Quantity Control.* (Machinery, Vol. 63, No. 1,603, 1/7/43, pp. 10-16.)
664	13567	U.S.A. ...	*Manufacturers Offer Plan for Surplus War Aircraft.* (C. Guest, American Aviation, Vol. 7, No. 3, 1/7/43, pp. 68, 70.)

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665	13622	G.B.	*Statistical Control at Bristols.* (Aeronautics, Vol. 8, No. 6, July, 1943, p. 30.)
666	13645	G.B.	*Production Control.* (A. J. Milne, Sheet Metal Industries, Vol. 17, No. 194, June, 1943, pp. 1030-1032.)
667	13652	G.B.	*Quantity Control Application to Small Quantity Output in the Aircraft Industry.* (K. Hayward, Aircraft Production, Vol. 5, No. 58, August, 1942, pp. 359-363.)
668	13721	U.S.A. ...	*Wartime Detroit.* (Automobile Engineer, Vol. 33, No. 437, June, 1943, pp. 244-245.)
669	13950	G.B.	*Quantity Control.* (Times, Trade and Engineering, Vol. 53, No. 954, August, 1943, pp. 31-32.)
670	14116	G.B.	*Quantity Control Charts.* (Production Engineering Bulletin, Vol. 2, No. 9, August, 1943, pp. 385-390.)
671	14117	G.B.	*British Standard Memorandum on Quantity Control (B.S. 600 R and B.S. 1,008).* (Production Engineering Bulletin, Vol. 2, No. 9, August, 1943, p. 390.)
672	14122	G.B.	*Personnel Management.* (Production Engineering Bulletin, Vol. 2, No. 9, August, 1943, pp. 415, 421.)
			Research and Training.
673	13191	G.B.	*Vocational Guidance and Selection for Post-War Training System. I.E.E. Education Scheme, II.* (Mechanical World, Vol. 113, No. 2,943, 28/5/43, pp. 580-581, 594-597.)
674	13240	U.S.A. ...	*Education for Management.* (H. V. Coes, Mechanical Engineering, Vol. 65, No. 7, July, 1943, pp. 486-488.)
675	13315	G.B.	*Aeronautical Technical Training.* (Flight, Vol. 44, No. 1,809, 26/8/43, p. 231.)
676	13325	U.S.A. ...	*What Can be Done to Train Women for Engineering Jobs.* (R. H. Baker and Mrs. O. S. Reimold, A.S.M.E. Preprints, October 12-14, 1942.)
677	13395	G.B.	*Research and Planning.* (Nature, Vol. 152, No. 3,849, 7/8/43, pp. 143-144.)
678	13405	G.B.	*Science in the U.S.S.R.* (J. G. Crowther, Endeavour, Vol. 1, No. 1, Jan., 1942, pp. 21-25.)
679	13449	G.B.	*Research in the United States.* (Nature, Vol. 151, No. 3,842, 19/6/43, p. 693.)
680	13513	G.B.	*Education of Aeronautical Engineers (Royal Aeronautical Society Resolutions).* (Aeroplane, Vol. 65, No. 1,683, 27/8/43, p. 231.)
681	13548	G.B.	*Selection and Training of Personnel (The I.E.E. Education Scheme—III).* (Mechanical World, Vol. 113, No. 2,944, 4/6/43, pp. 623-624.)
682	13670	U.S.A. ...	*Relationship Between the Unions and Engineers.* (W. Gomberg, Mech. Engineering. Vol. 65, No. 6, June, 1943, pp. 425-430.)
683	13685	G.B.	*Training of Sheet Metal Engineers.* (A. Dickason, Sheet Metal Industries, Vol. 18, No. 196, 30/7/43, pp. 1391-1392.)

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684	13717	G.B.	*Post-War Education.* (Automobile Engineer, Vol. 33, No. 437, June, 1943, pp. 235-237.)
685	13748	G.B.	*Research and National Policy.* (Mechanical World, Vol. 114, No. 2,955, 20/8/43, p. 211.)
686	13769	U.S.A. ...	*U.S. Production and Technique.* (Sir Roy Fedden, Aeronautics, Vol. 8, No. 5, June, 1943, p. 52.)
687	13834	G.B.	*Technical Training — Post-Graduate Research.* (Flight, Vol. 44, No. 1,805, July, 1943, p. 123.)
688	13845	G.B.	*International Organisation of Research.* (Engineering, Vol. 156, No. 4,050, 27/8/43, pp. 171-172.)
689	13854	G.B.	*Future of British Engineering.* (Sir Roy Fedden, Aeroplane, Vol. 65, No. 1,679, 30/7/43, p. 119.)
690	13881	G.B.	*Rôle of Humanities in Education.* (H. C. B. Phillips, Light Metals, Vol. 6, No. 67, August, 1943, pp. 371-377.)
691	13882	G.B.	*Industry and Education.* (G. L. Harbach and J. R. Horton, Light Metals, Vol. 6, No. 67, August, 1943, pp. 377-380.)
692	13946	G.B.	*Education in Industry—I. Metropolitan Vickers.* (A. P. M. Fleming, Times, Trade and Engineering, Vol. 53, No. 954, August, 1943, p. 22.)
693	14142	G.B.	*Education of Engineers (Memorandum Issued by the Institute of Mechanical Engineers).* (Engineer, Vol. 176, No. 4,573, 3/9/43, pp. 185-187.)
			Aircraft Production Methods.
694	13215	U.S.A. ...	*The Automatic Body Engineer in Aviation.* (J. C. Widman, Flying and Industrial Aviation, Vol. 32, No. 1, Jan., 1943, pp. 61, 87, 94.)
695	13216	U.S.A. ...	*Selecting the Aerofoil Section.* (R. J. Hoffman, Flying and Industrial Aviation, Vol. 32, No. 1, Jan., 1943, pp. 66, 143-145.)
696	13219	U.S.A. ...	*Production Technique at Douglas.* (Flying and Industrial Aviation, Vol. 32, No. 1, Jan., 1943, pp. 89-90, 138.)
697	13220	U.S.A. ...	*Substitution of Phosphoric and Chromic Acid for Hydrofluoric Acid for Cleaning Sheet Metal to be Spot Welded.* (Flying and Industrial Aviation, Vol. 32, No. 1, January, 1943, p. 90.)
698	13221	U.S.A. ...	*Speeding Propeller Production.* (Flying and Industrial Aviation, Vol. 32, No. 1, January, 1943, p. 92.)
699	13235	U.S.A. ...	*Aircraft Engines on the Production Line.* (H. E. Linsley, Mechanical Engineering, Vol. 65, No. 7, July, 1943, pp. 493-496.)
700	13237	U.S.A. ...	*Finishes for Plywood in the Aircraft Industry.* (R. B. Anderson, Mechanical Engineering, Vol. 65, No. 7, July, 1943, pp. 506-510.)
701	13259	U.S.A. ...	*Preparing American Aircraft for Operational Work (Modification Centres).* (Automotive Industries, Vol. 89, No. 1, 1/7/43, pp. 17-20, 82.)
702	13263	U.S.A. ...	*Impression Cast Jaws for Aircraft Fittings.* (H. F. Lenz, Automotive Industries, Vol. 89, No. 1, 1/7/43, pp. 34-36.)

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703	13268	G.B.	...	*Furnace Brazing—A New Process for the Manufacture of Thin-Wall Landing Gear Components.* (D. H. Smith, Aircraft Production, Vol. 5, No. 59, September, 1943, pp. 411-414.)
704	13271	G.B.	...	*The Cheetah X, Pt. II. Machining the Cylinder Unit, Introduction Casing Rear Cover and the Crankcase.* (Aircraft Production, Vol. 5, No. 59, September, 1943, pp. 418-428.)
705	13273	G.B.	...	*Metal Cementing Process.* (Aircraft Production, Vol. 5, No. 59, September, 1943, p. 430.)
706	13274	U.S.A.	...	*Conveyor Line Assembly—Continuously Moving Track System for Lockheed Lightning Fighter.* (Aircraft Production, Vol. 5, No. 59, September, 1943, pp. 431-433.)
707	13275	Canada	...	*Canadian Production of Aircraft.* (Aircraft Production, Vol. 5, No. 59, September, 1943, p. 433.)
708	13276	G.B.	...	*Gravity Die Casting, Pt. I. Organisation and Casting Methods at a Rolls Royce Foundry.* (Aircraft Production, Vol. 5, No. 59, September, 1943, pp. 434-442.)
709	13277	U.S.A.	...	*Metal Spraying (Survey of American Practice).* (Aircraft Production, Vol. 5, No. 59, September, 1943, pp. 445-447.)
710	13278	G.B.	...	*Rivet Salvage (Blackburn Sorting Scheme).* (Aircraft Production, Vol. 5, No. 59, September, 1943, pp. 453-454.)
711	13279	G.B.	...	*Aircraft Electrical Wiring (The Oddie System of Cable Harness Attachment).* (Aircraft Production, Vol. 5, No. 59, September, 1943, p. 454.)
712	13324	U.S.A.	...	*Modification Centres.* (E. H. Forbes, U.S. Air Services, Vol. 28, No. 6, June, 1943, pp. 30-32.)
713	13327	U.S.A.	...	*Production of Aircraft Propeller Blades from Steel Tube.* (Machinery, Vol. 63, No. 1,607, 29/7/43, pp. 122-128.)
714	13391	G.B.	...	*Riveting (Especially for Aircraft, 1936 to Date).* (Sci. Lib. Bibliog. Series, No. 590, 1943.)
715	13463	U.S.A.	...	*The Automotive Industry in Naval Aircraft Production.* (R. E. Davison, Paper Presented at S.A.E. Meeting, June 9-10, 1943.)
716	13485	G.B.	...	*Machining Aircraft and Tank Turret Gear Rings.* (Machinery, Vol. 62, No. 1,597, 20/5/43, pp. 540-542.)
717	13560	U.S.A.	...	*Saving Weight in Air Shipment by Scientific Packaging.* (B. C. McNamee, American Aviation, Vol. 7, No. 3, 1/7/43, pp. 22-24.)
718	13582	U.S.A.	...	*Atomic-Hydrogen Arc Welding Aids Production.* (Flying and Industrial Aviation, Vol. 32, No. 6, June, 1943, pp. 103-104, 115.)
719	13583	U.S.A.	...	*Buick Builds Welded Steel Manifolds.* (Flying and Industrial Aviation, Vol. 32, No. 6, June, 1943, pp. 106, 115.)
720	13584	U.S.A.	...	*Mass Producton of Curtiss Propellers (Photograph).* (Flying and Industrial Aviation, Vol. 32, No. 6, June, 1943, p. 108.)

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721	13659	U.S.A. ...	*Boston Line Assembly.* (Aircraft Production, Vol. 5, No. 58, August, 1942, pp. 385-392.)
722	13742	U.S.A. ...	*Hi Shear Rivets Save Weight.* (Air Tech., Vol. 3, No. 1, 15/7/43, p. 50.)
723	13764	U.S.A. ...	*Portable Aeroplane Hoist.* (American Exporter, Vol. 133, No. 1, July, 1943, p. 74.)
724	13896	U.S.A ...	*Thin Case Hardening with Radio Frequency Energy.* (V. W. Sherman, Aero. Engg. Review, May, 1943, pp. 7-16.) (Metropolitan Vickers News Bulletin, No. 875, 16/7/43, p. 8.)
725	14070	U.S.A. ...	*Moulded Plastic Bonded Veneers and Wood in Aircraft Production.* (R. J. Nebesar, Engineers' Digest, Vol. 4, No. 6, June, 1943, pp. 168-171.)
726	14107	G.B.	*Development of Aircraft Detail Fittings (Precision Sheet Metal Work)—Pt. I.* (W. Cookson, Sheet Metal Industries, Vol. 18, No. 197, Sept., 1943, pp. 1575-1578.)
727	14151	G.B.	*Forming Aircraft Extrusions.* (Metal Industry, Vol. 63, No. 10, 3/9/43, p. 156.)
728	14584	Germany ...	*German Aircraft Production and New Development.* (Aeroplane, Vol. 65, No. 1,680, 6/8/43, pp. 153-154.)
			Plant Equipment and Tools.
729	13170	G.B.	*5,500-Ton Capacity Southwark Hydraulic Press (Photograph).* (Mechanical Engineering, Vol. 65, No. 8, August, 1943, p. 593.)
730	13333	G.B.	*Production Gauge Design and Dimensioning.* (Machinery, Vol. 63, No. 1,609, 12/8/43, pp. 178-181.)
731	13336	U.S.A. ...	*Chucking Fixture for Die Castings.* (Machinery, Vol. 63, No. 1,609, 18/8/43, p. 185.)
732	13451	G.B.	*Wire Ropers for Industrial Use.* (Mech. World, Vol. 113, No. 2,946, 18/6/43, pp. 665-667.)
733	13536	G.B.	*Craven 27-inch Centre Lathe for Crankshaft Turning.* (Machinery, Vol. 63, No. 1,603, 1/7/43, pp. 21-22.)
734	13537	G.B.	*Avery Dynamic Testing Machine.* (Machinery, Vol. 63, No. 1,603, 1/7/43, pp. 22-23.)
735	13566	U.S.A. ...	*New Angle Gauge for Checking Aircraft Components.* (American Aviation, Vol. 7, No. 3, 1/7/43, p. 65.)
736	13587	U.S.A. ...	*New Hydraulic Test Bench.* (Flying and Industrial Aviation, Vol. 32, No. 6, June, 1943, p. 112.)
737	13649	G.B.	*Jigs and Fixtures for Simple Assemblies.* (Sheet Metal Industries, Vol. 17, No. 194, June, 1943, pp. 1055-1060.)
738	13662	U.S.A. ...	*New American Automatic and Portable X-Ray Equipment.* (Aircraft Production, Vol. 5, No. 58, August, 1943, p. 404.)
739	13673	U.S.A. ...	*New Vertical Honing Machine.* (Mech. Engg., Vol. 65, No. 6, June, 1943, p. 21.)
740	13691	G.B.	*The Equipment and Organisation of a Welding Laboratory.* (Sheet Metal Industries, Vol. 18, No. 196, 30/7/43, pp. 1426-1428, 1432.)

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741	13720	G.B.	*New Plant and Tools.* (Automobile Engineer, Vol. 33, No. 437, June, 1943, pp. 241-244.)
742	13763	U.S.A. ...	*Rivet Holding Device.* (American Exporter, Vol. 133, No. 1, July, 1943, p. 72.)
743	14002	G.B.	*Hand Feed Surface Grinding Machine.* (Engineer, Vol. 176, No. 4,567, 23/7/43, p. 75.)
			Scrap Salvage.
744	13443	G.B.	*Building Up Rejected Components with Deposits of Nickel or Chromium.* (Prod. and Eng. Bull., Vol. 2, No. 8, June-July, 1943, pp. 375-382.)
745	14119	G.B.	*Practical Methods of Segregating Steel Swarf.* (Production Engineering Bulletin, Vol. 2, No. 9, August, 1943, pp. 397-402.)
746	13618	G.B.	*Rotol Airscrews System of Metal Salvage.* (Trade and Engineering Times, Vol. 53, No. 951, May, 1943, p. 36.)
747	14118	G.B.	*Scrap Campaign in the Factory.* (Production Engineering Bulletin, Vol. 2, No. 9, Aug., 1943, pp. 393-395.)
			Welfare of Workers.
748	13501	G.B.	*Wage Systems and Incentives.* (T. E. A. K. Jackson, Mechanical World, Vol. 113, No. 2,945, 11/6/43, pp. 638-641, 650-654.)
749	13455	G.B.	*Accident Prevention in Industry.* (Mech. World, Vol. 113, No. 2,946, 18/6/43, p. 662.)
750	13452	G.B.	*Medical Supervision in the Factory.* (G. Lowe, Mech. World, Vol. 113, No. 2,946, 18/6/43, pp. 668-669.)
751	13539	G.B.	*Heating and Ventilating in the New Factory.* (J. V. Brittain, Mechanical World, Vol. 113, No. 2,944, 4/6/43, pp. 603-606.)
752	13433	G.B.	*Production and Colours.* (Autom. Eng., Vol. 33, No. 436, May, 1943, p. 208.)
753	13658	G.B.	*Motion Study — Increasing Production by the Elimination of Unnecessary Effort.* (J. W. Hendry, Aircraft Production, Vol. 5, No. 58, August, 1942, pp. 381-384.)
754	13543	G.B.	*Protecting the Skin of Industrial Workers.* (A. J. T. Eyles, Mechanical World, Vol. 113, No. 2,944, 4/6/43, pp. 608-610.)
			TRANSPORT (TANKS, " DUCKS," TRACTORS).
755	13186	G.B.	*A Gas Turbine Locomotive.* (P. R. Sidler, Mechanical World, Vol. 114, No. 2,953, 6/8/43, pp. 160-161.)
756	13368	G.B.	*Protection of Motor Vehicles and Engines in Storage.* (P. V. Lamarque, Engineering, Vol. 156, No. 4,049, 20/8/43, pp. 156-157.)
757	13462	U.S.A. ...	*Engines for Tanks.* (R. J. Icks, Paper Presented at S.A.E. Meeting, June 9-10, 1943.)
758	13466	U.S.A. ...	*Dust Problems in Military Vehicle Operations.* (L. F. Overholt, Paper Presented at S.A.E. Meeting, June 9-10, 1943.)

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759	13467	U.S.A. ...	*Lessons Learned from World War II about Designing for Accessibility.* (E. S. Van Deusen, Paper Presented at S.A.E. Meeting, June 9-10, 1943.)
760	13474	U.S.A. ...	*Field Modification of Ordnance Vehicles.* (H. O. Matthews, Paper Presented at S.A.E. Meeting, May 5-6, 1943.)
761	13499	G.B.	*The Redesign of a Small Towing Tractor for Arc Welded Contruction.* (Mech. World, Vol. 113, No. 2,945, 11/6/43, pp. 631-634.)
762	13711	G.B.	*Vehicle Suspensions.* (I.A.E. Automobile Research Committee, No. 1,943-1,944.)
763	13724	G.B.	*Method of Graphical Analysis of Car Performances.* (H. Cousins, Automobile Engineer, Vol. 33, No. 437, June, 1943, pp. 249-250.)
764	13873	U.S.A. ...	*Enemy Weapons—Collection and Analysis of Captured Material (including Photographs of Enemy Artillery, Tanks, etc.).* (S. B. Ritchie, Army Ordnance, Vol. 25, No. 139, July-Aug., 1943, pp. 96-99, 105-112.)
765	13893	G.B.	*I.A.E. Automobile Research Committee Abstract, May,* 1943. (Index of I.A.E. Abstracts for May, 1943.)
766	13933	U.S.A. ...	*U.S. Army Amphibian Vehicles.* (Engineering, Vol. 156, No. 4,045, 23/7/43, p. 75.)
767	14018	G.B.	*Locomotive Machine Friction.* (L. H. Fry, Engineering, Vol. 156, No. 1,044, 16/7/43, pp. 3-5.)

WIRELESS AND ELECTRICITY.

Aircraft Radio.

768	13168	U.S.A. ...	*Development of Radar.* (Mechanical Tng., Vol. 65, No. 8, Aug., 1943, pp. 590-592.)
769	13304	U.S.A. ...	*Developments in Detecting and Ranging by Radio ("Radar").* (Scientific American, Vol. 169, No. 2, Aug., 1943, pp. 78-80.)
770	13323	U.S.A. ...	*Radar—Aerial Watchdog.* (Bradley Jones, U.S. Air Services, Vol. 28, No. 6, June, 1943, pp. 19, 45.)
771	13835	G.B.	*Emergency S.O.S. Transmitters for Air-Sea Rescue Work.* (Flight, Vol. 44, No. 1,805, July, 1943, p. 125.)
772	13875	U.S.A. ...	*The Development of "Radar" (Radio Detecting and Ranging).* (Army Ordnance, Vol. 25, No. 139, July-Aug., 1943, pp. 136-137.)
773	14027	G.B.	*General Report on Radio Equipment, Type F.U.G. 7.* (Enemy Aircraft Reports (Issued by M.A.P.), 1943, pp. 1-6.)
774	14033	G.B.	*Radio Equipment of Heinkel 111H.* (Enemy Aircraft Reports (Issued by M.A.P.), 1943, pp. 1-37.)
775	14139	G.B.	*Sensitive Relays—Light Current Devices for Radio and Allied Uses.* (J. H. Jupe, Wireless World, Vol. 47, No. 8, August, 1943, pp. 234-237.)

General Wireless and Telephone.

776	13706	G.B.	*Cross Talk in Telephone Cables.* (Siemen's Mag. Eng. Suppl., No. 208, Dec.-Jan., 1943.)

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777	13783	U.S.A. ...	*Radio Engineering in War Time.* (L. Fry, Procs. of the I.R.E., Vol. 31, Pt. 1, No. 6, June, 1943, pp. 303-304.)
778	13784	U.S.A. ...	*A Waterproofing Material for Radio Ceramic Forms ("Dri-Film").* (Procs. of the I.R.E., Vol. 31, Pt. 1, No. 6, June, 1943, pp. 30-32.)
779	13785	U.S.A. ...	*Improved Selenium Rectifier.* (Procs. of the I.R.E., Vol. 31, Pt. 1, No. 6, June, 1943, pp. 40-41.)
780	13918	Australia ...	*Australian Radio Technical Services and Patents Company Bulletin.* (Nos. 77-89, 92-110, 128.)
781	14140	Japan ...	*Japanese Morse.* (Wireless World, Vol. 49, No. 8, Aug., 1943, p. 242.)
782	14141	G.B.	*F.M. Loudspeaker Distortion.* (Wireless World, Vol. 49, No. 8, Aug., 1943, pp. 248-249.)
			Ultra-Short Waves.
783	13907	G.B.	*Ultra-Short Electro-Magnetic Waves—IV. Guided Propagation.* (El. Engg., June, 1943, pp. 235-246.) (S. A. Schelkunoff, Metropolitan Vickers Tech. News Bulletin, No. 877, 30/7/43, p. 1.)
784	13913	G.B.	*Ultra-Short Electro-Magnetic Waves—III. Generation.* (El. Engg., May, 1943, pp. 206-215.) (I. E. Mouronitseff, Metropolitan Vickers Tech. News Bulletin, No. 876, 23/7/43, p. 8.)
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